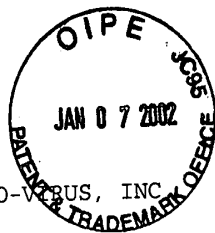


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<210> 8  
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<210> 9  
<211> 1269  
<212> DNA  
<213> Vesicular stomatitis virus

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tacatcaata ctacaaaaag tttgtcagat ctaagaggat atgtctacca aggcctcaaa 180  
tccggaaatg tatcaatcat acatgtcaac agctacttgt atggagcatt aaaggacatc 240  
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acaatcggaa tatttgacct tgtatccttg aaagccctgg acggcgctact tccagatgga 360  
gtatcggatg cttccagaac cagcgcagat gacaaatggg tgcccttgta tctacttggc 420  
ttatacagag tgggcagAAC acaaatgcct gaatacagaa aaaagctcat ggatgggctg 480  
acaaatcaat gcaaaatgat caatgaacag tttgaacctc ttgtgccaga aggtcgtgac 540  
atTTTTgatg tgtggggaaa tgacagtaat tacacaaaaa ttgtcgctgc agtggacatg 600  
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<213> Vesicular stomatitis virus

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tacatcaata ctacaaaaag tttgtcagat ctaagaggat atgtctacca aggcctcaaa 180  
tccggaaatg tatcaatcat acatgtcaac agctacttgt atggagcatt gaaggacatc 240  
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ttatacagag tgggcagAAC acaaatgcct gaatacagaa aaaggctcat ggatgggctg 480
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gtcatgtcac tgcaaggcct aagagagaag acaattggca agtatgctaa gtcagaattt 1260
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<210> 11

<211> 1269

<212> DNA

<213> Vesicular stomatitis virus

<400> 11

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tacctcaata ctacaaaaag tttgtcagat ctaagaggat atgtctacca aggcctcaaa 180
tccggaaatg tatcaatcat acatgtcaac agtacttgtt atggagcatt gaaggacatc 240
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<210> 12

<211> 1269

<212> DNA

<213> Vesicular stomatitis virus

<400> 12

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<210> 13
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<212> DNA
<213> Vesicular stomatitis virus

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<210> 14
<211> 422
<212> PRT
<213> Vesicular stomatitis virus

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<400> 14

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Arg Lys Ser Lys Glu Ile Pro Leu Tyr Ile Asn Thr Thr Lys Ser Leu  
35 40 45

Ser Asp Leu Arg Gly Tyr Val Tyr Gln Gly Leu Lys Ser Gly Asn Val  
50 55 60

Ser Ile Ile His Val Asn Ser Tyr Leu Tyr Gly Ala Leu Lys Asp Ile  
65 70 75 80

Arg Gly Lys Leu Asp Lys Asp Trp Ser Ser Phe Gly Ile Asn Ile Gly  
85 90 95

Lys Ala Gly Asp Thr Ile Gly Ile Phe Asp Leu Val Ser Leu Lys Ala  
100 105 110

Leu Asp Gly Val Leu Pro Asp Gly Val Ser Asp Ala Ser Arg Thr Ser  
115 120 125

Ala Asp Asp Lys Trp Leu Pro Leu Tyr Leu Leu Gly Leu Tyr Arg Val  
130 135 140

Gly Arg Thr Gln Met Pro Glu Tyr Arg Lys Lys Leu Met Asp Gly Leu  
145 150 155 160

Thr Asn Gln Cys Lys Met Ile Asn Glu Gln Phe Glu Pro Leu Val Pro  
165 170 175

Glu Gly Arg Asp Ile Phe Asp Val Trp Gly Asn Asp Ser Asn Tyr Thr  
180 185 190

Lys Ile Val Ala Ala Val Asp Met Phe Phe His Met Phe Lys Lys His  
195 200 205

Glu Cys Ala Ser Phe Arg Tyr Gly Thr Ile Val Ser Arg Phe Lys Asp  
210 215 220

Cys Ala Ala Leu Ala Thr Phe Gly His Leu Cys Lys Ile Thr Gly Met  
225 230 235 240

Ser Thr Glu Asp Val Thr Thr Trp Ile Leu Asn Arg Glu Val Ala Asp  
245 250 255

Glu Met Val Gln Met Met Leu Pro Gly Gln Glu Ile Asp Lys Ala Asp  
260 265 270

Ser Tyr Met Pro Tyr Leu Ile Asp Phe Gly Leu Ser Ser Lys Ser Pro  
275 280 285

Tyr Ser Ser Val Lys Asn Pro Ala Phe His Phe Trp Gly Gln Leu Thr



290	295	300
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Asp Ile Glu Tyr Thr Ser Leu Thr Thr Ala Gly Leu Leu Tyr Ala Tyr 325 330 335		
Ala Val Gly Ser Ser Ala Asp Leu Ala Gln Gln Phe Cys Val Gly Asp 340 345 350		
Asn Lys Tyr Thr Pro Asp Asp Ser Thr Gly Gly Leu Thr Thr Asn Ala 355 360 365		
Pro Pro Gln Gly Arg Asp Val Val Glu Trp Leu Gly Trp Phe Glu Asp 370 375 380		
Gln Asn Arg Lys Pro Thr Pro Asp Met Met Gln Tyr Ala Lys Arg Ala 385 390 395 400		
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Lys Ser Glu Phe Asp Lys 420		
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Lys Leu Pro Ala Asn Glu Asp Pro Val Glu Tyr Pro Ala Asp Tyr Phe 20 25 30		
Arg Lys Ser Lys Glu Ile Pro Leu Tyr Ile Asn Thr Thr Lys Ser Leu 35 40 45		
Ser Asp Leu Arg Gly Tyr Val Tyr Gln Gly Leu Lys Ser Gly Asn Val 50 55 60		
Ser Ile Ile His Val Asn Ser Tyr Leu Tyr Gly Ala Leu Lys Asp Ile 65 70 75 80		
Arg Gly Lys Leu Asp Lys Asp Trp Ser Ser Phe Gly Ile Asn Ile Gly 85 90 95		
Lys Ala Gly Asp Thr Ile Gly Ile Phe Asp Leu Val Ser Leu Lys Ala 100 105 110		
Leu Asp Gly Val Leu Pro Asp Gly Val Ser Asp Ala Ser Arg Thr Ser 115 120 125		

Ala Asp Asp Lys Trp Leu Pro Leu Tyr Leu Leu Gly Leu Tyr Arg Val  
 130 135 140  
 Gly Arg Thr Gln Met Pro Glu Tyr Arg Lys Arg Leu Met Asp Gly Leu  
 145 150 155 160  
 Thr Asn Gln Cys Lys Met Ile Asn Glu Gln Phe Glu Pro Leu Val Pro  
 165 170 175  
 Glu Gly Arg Asp Ile Phe Asp Val Trp Gly Asn Asp Ser Asn Tyr Thr  
 180 185 190  
 Lys Ile Val Ala Ala Val Asp Met Phe Phe His Met Phe Lys Lys His  
 195 200 205  
 Glu Cys Ala Ser Phe Arg Tyr Gly Thr Ile Val Ser Arg Phe Lys Asp  
 210 215 220  
 Cys Ala Ala Leu Ala Thr Phe Gly His Leu Cys Lys Ile Thr Gly Met  
 225 230 235 240  
 Ser Thr Glu Asp Val Thr Thr Trp Ile Leu Asn Arg Glu Val Ala Asp  
 245 250 255  
 Glu Met Val Gln Met Met Leu Pro Gly Gln Glu Ile Asp Lys Ala Asp  
 260 265 270  
 Ser Tyr Met Pro Tyr Leu Ile Asp Phe Gly Leu Ser Ser Lys Ser Pro  
 275 280 285  
 Tyr Ser Ser Val Lys Asn Pro Ala Phe His Phe Trp Gly Gln Leu Thr  
 290 295 300  
 Ala Leu Leu Leu Arg Ser Thr Arg Ala Arg Asn Ala Arg Gln Pro Asp  
 305 310 315 320  
 Asp Ile Glu Tyr Thr Ser Leu Thr Thr Ala Gly Leu Leu Tyr Ala Tyr  
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 340 345 350  
 Ser Lys Tyr Thr Pro Asp Asp Ser Thr Gly Gly Leu Thr Thr Asn Ala  
 355 360 365  
 Pro Pro Gln Gly Arg Asp Val Val Glu Trp Leu Gly Trp Phe Glu Asp  
 370 375 380  
 Gln Asn Arg Lys Pro Thr Pro Asp Met Met Gln Tyr Ala Lys Arg Ala  
 385 390 395 400  
 Val Met Ser Leu Gln Gly Leu Arg Glu Lys Thr Ile Gly Lys Tyr Ala  
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 Lys Ser Glu Phe Asp Lys  
 420



<210> 16  
<211> 422  
<212> PRT  
<213> Vesicular stomatitis virus

<400> 16

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Lys Leu Pro Ala Asn Glu Asp Pro Val Glu Tyr Pro Ala Asp Tyr Phe  
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Arg Lys Ser Lys Glu Ile Pro Leu Tyr Ile Asn Thr Thr Lys Ser Leu  
35 40 45  
Ser Asp Leu Arg Gly Tyr Val Tyr Gln Gly Leu Lys Ser Gly Asn Val  
50 55 60  
Ser Ile Ile His Val Asn Ser Tyr Leu Tyr Gly Ala Leu Lys Asp Ile  
65 70 75 80  
Arg Gly Lys Leu Asp Lys Asp Trp Ser Ser Phe Gly Ile Asn Ile Gly  
85 90 95  
Lys Ala Gly Asp Thr Ile Gly Ile Phe Asp Leu Val Ser Leu Lys Ala  
100 105 110  
Leu Asp Gly Val Leu Pro Asp Gly Val Ser Asp Ala Ser Arg Thr Ser  
115 120 125  
Ala Asp Asp Lys Trp Leu Pro Leu Tyr Leu Leu Gly Leu Tyr Arg Val  
130 135 140  
Gly Arg Thr Gln Met Pro Glu Tyr Arg Lys Arg Leu Met Asp Gly Leu  
145 150 155 160  
Thr Asn Gln Cys Lys Met Ile Asn Glu Gln Phe Glu Pro Leu Val Pro  
165 170 175  
Glu Gly Arg Asp Ile Phe Asp Val Trp Gly Asn Asp Ser Asn Tyr Thr  
180 185 190  
Lys Ile Val Ala Ala Val Asp Met Phe Phe His Met Phe Lys Lys His  
195 200 205  
Glu Cys Ala Ser Phe Arg Tyr Gly Thr Ile Val Ser Arg Phe Lys Asp  
210 215 220  
Cys Ala Ala Leu Ala Thr Phe Gly His Leu Cys Lys Ile Thr Gly Met  
225 230 235 240  
Ser Thr Glu Asp Val Thr Thr Trp Ile Leu Asn Arg Glu Val Ala Asp  
245 250 255  
Glu Met Val Gln Met Met Leu Pro Gly Gln Glu Ile Asp Lys Ala Asp  
260 265 270

Ser Tyr Met Pro Tyr Leu Ile Asp Phe Gly Leu Ser Ser Lys Ser Pro  
 275 280 285  
 Tyr Ser Ser Val Lys Asn Pro Ala Phe His Phe Trp Gly Gln Leu Thr  
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 Ala Leu Leu Leu Arg Ser Thr Arg Ala Arg Asn Ala Arg Gln Pro Asp  
 305 310 315 320  
 Asp Ile Glu Tyr Thr Ser Leu Thr Thr Ala Gly Leu Leu Tyr Ala Tyr  
 325 330 335  
 Ala Val Gly Ser Ser Ala Asp Leu Ala Gln Gln Phe Cys Val Gly Asp  
 340 345 350  
 Ser Lys Tyr Thr Pro Asp Asp Ser Thr Gly Gly Leu Thr Thr Asn Ala  
 355 360 365  
 Pro Pro Gln Gly Arg Asp Val Val Glu Trp Leu Gly Trp Phe Glu Asp  
 370 375 380  
 Gln Asn Arg Lys Pro Thr Pro Asp Met Met Gln Tyr Ala Lys Arg Ala  
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 Lys Ser Glu Phe Asp Lys  
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<210> 17  
 <211> 342  
 <212> PRT  
 <213> Vesicular stomatitis virus

<220>  
 <221> MOD\_RES  
 <222> (1)..(342)  
 <223> "Xaa" represents any, other or unknown amino acid

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 Lys Ala Gly Asp Thr Ile Gly Ile Phe Asp Leu Val Ser Leu Lys Ala  
 35 40 45  
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 65 70 75 80



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<210> 19

<211> 798

<212> DNA

<213> Vesicular stomatitis virus

<400> 19

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caagaggacg gagtggaga gcatactagg ccctcttatt ttcaggcagc agatgattct 180
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acgattaaag cagtcgttca aagtgccaaa cactggaatc tggcagagtg cacatttgaa 480
gcatcgaggag aaggggtcat cataaaaaag cgccagataa ctccggatgt atataaggtc 540
actccagtga tgaacacaca tccgtcccaa tcagaagccg tatcagatgt ttggtctctc 600
tcaaagacat ccatgacttt ccaacccaag aaagcaagtc ttcagcctct caccatatcc 660
ttggatgaat tgttctcatc tagaggagaa ttcatctctg tcggaggtaa cggacgaatg 720
tctcataaag aggccatcct gctcggctct aggtacaaaa agttgtacaa tcaggcgaga 780
gtcaaatatt ctctgtag 798
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<210> 20

<211> 570

<212> DNA

<213> Vesicular stomatitis virus

<400> 20

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atggataatc tcacaaaagt tcgtgagtat ctcaagtcct attctcgtct agatcaggcg 60
gtaggagaga tagatgagat cgaagcacia cgagctgaaa agtccaatta tgagttgttc 120
caagaggacg gagtggaga gcatactagg ccctcttatt ttcaggcagc agatgattct 180
gacacagaat ctgaaccaga aattgaagac aatcaagggt tgtatgtacc agatccggaa 240
gctgagcaag ttgaaggctt tatacagggg cctttagatg actatgcgga tgaggacgtg 300
gatgttgat ttacttcgga ctggaaacag cctgagcttg aatccgacga gcatggaaag 360
accttacggg tgacattgcc agagggttta agtggagagc agaaatccca gtggcttttg 420
acgattaaag cagtcgttca aagtgccaaa cactggaatc tggcagagtg cacatttgaa 480
gcatcgaggag aaggggtcat cataaaaaag cgccagataa ctccggatgt atataaggtc 540
actccagtga tgaacacaca tccgtcccaa 570
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<210> 21  
<211> 798  
<212> DNA  
<213> Vesicular stomatitis virus

<400> 21  
atggataatc tcacaaaagt tcgtgagtat ctcaagtcct attctcgtct agatcaggcg 60  
gtaggagaga tagatgagat cgaagcacia cgagctgaaa agtccaatta tgagttgttc 120  
caagaggacg gagtgggaaga gcatactagg ccctcttatt ttcaggcagc agatgattct 180  
gacacagaat ctgaaccaga aattgaagac aatcaaggct tgtatgtacc agatccggaa 240  
gctgagcaag ttgaaggcct tatacagggg cctttagatg actatgcgga tgaggacgtg 300  
gatgttgtat tcaacttcgga ctggaaacag cctgagcttg aatccgacga gcatggaaaag 360  
accttacggg tgacattgcc agagggttta agtggagagc agaaatccca gtggcttttg 420  
acgattaaag cagtcgttca aagtgcctaa cactggaatc tggcagagtg cacatttgaa 480  
gcatcgaggag aaggggtcat cataaaaaag cgccagataa ctccggatgt atataaggtc 540  
actccagtga tgaacacaca tccgtcccaa tcggaagccg tatcagatgt ttggtctctc 600  
tcaaagacat ccatgacttt ccaacccaag aaagcaagtc ttcagcctct caccatatcc 660  
ttggatgaat tgttctcatc tagaggagaa ttcattctctg tcggaggtaa cggacgaatg 720  
tctcataaag aggccatcct gctcgggtctg aggtacaaaa agttgtacaa tcaggcgaga 780  
gtcaaatatt ctctgtag 798

<210> 22  
<211> 798  
<212> DNA  
<213> Vesicular stomatitis virus

<400> 22  
atggataatc tcacaaaagt tcgtgagtat ctcaagtcct attctcgtct agatcaggcg 60  
gtaggagaga tagatgagat cgaagcacia cgagctgaaa agtccaatta tgagttgttc 120  
caagaggacg gagtgggaaga gcatactagg ccctcttatt ttcaggcagc agatgattct 180  
gacacagaat ctgaaccaga aattgaagac aatcaaggct tgtatgtacc agatccggaa 240  
gctgagcaag ttgaaggcct tatacagggg cctttagatg actatgcgga tgaggacgtg 300  
gatgttgtat tcaacttcgga ctggaaacag cctgagcttg aatccgacga gcatggaaaag 360  
accttacggg tgacattgcc agagggttta agtggagagc agaaatccca gtggcttttg 420  
acgattaaag cagtcgttca aagtgcctaa cactggaatc tggcagagtg cacatttgaa 480  
gcatcgaggag aaggggtcat cataaaaaag cgccagataa ctccggatgt atataaggtc 540  
actccagtga tgaacacaca tccgtcccaa tcagaagccg tatcagatgt ttggtctctc 600  
tcaaagacat ccatgacttt ccaacccaag aaagcaagtc ttcagcctct caccatatcc 660  
ttggatgaat tgttctcatc tagaggagaa ttcattctctg tcggaggtaa cggacgaatg 720  
tctcataaag aggccatcct gctcgggtctg aggtacaaaa agttgtacaa tcaggcgaga 780  
gtcaaatatt ctctgtag 798

<210> 23  
<211> 265  
<212> PRT  
<213> Vesicular stomatitis virus

<400> 23  
Met Asp Asn Leu Thr Lys Val Arg Glu Tyr Leu Lys Ser Tyr Ser Arg  
1 5 10 15  
Leu Asp Gln Ala Val Gly Glu Ile Asp Glu Ile Glu Ala Gln Arg Ala  
20 25 30

Glu Lys Ser Asn Tyr Glu Leu Phe Gln Glu Asp Gly Val Glu Glu His  
                   35                                  40                                  45  
 Thr Lys Pro Ser Tyr Phe Gln Ala Ala Asp Asp Ser Asp Thr Glu Ser  
                   50                                  55                                  60  
 Glu Pro Glu Ile Glu Asp Asn Gln Gly Leu Tyr Ala Gln Asp Pro Glu  
                   65                                  70                                  75                                  80  
 Ala Glu Gln Val Glu Gly Phe Ile Gln Gly Pro Leu Asp Asp Tyr Ala  
                                   85                                  90                                  95  
 Asp Glu Glu Val Asp Val Val Phe Thr Ser Asp Trp Lys Pro Pro Glu  
                                   100                                  105                                  110  
 Leu Glu Ser Asp Glu His Gly Lys Thr Leu Arg Leu Thr Ser Pro Glu  
                   115                                  120                                  125  
 Gly Leu Ser Gly Glu Gln Lys Ser Gln Trp Leu Ser Thr Ile Lys Ala  
                   130                                  135                                  140  
 Val Val Gln Ser Ala Lys Tyr Trp Asn Leu Ala Glu Cys Thr Phe Glu  
                   145                                  150                                  155                                  160  
 Ala Ser Gly Glu Gly Val Ile Met Lys Glu Arg Gln Ile Thr Pro Asp  
                                   165                                  170                                  175  
 Val Tyr Lys Val Thr Pro Val Met Asn Thr His Pro Ser Gln Ser Glu  
                                   180                                  185                                  190  
 Ala Val Ser Asp Val Trp Ser Leu Ser Lys Thr Ser Met Thr Phe Gln  
                   195                                  200                                  205  
 Pro Lys Lys Ala Ser Leu Gln Pro Leu Thr Ile Ser Leu Asp Glu Leu  
                   210                                  215                                  220  
 Phe Ser Ser Arg Gly Glu Phe Ile Ser Val Gly Gly Asp Gly Arg Met  
                   225                                  230                                  235                                  240  
 Ser His Lys Glu Ala Ile Leu Leu Gly Leu Arg Tyr Lys Lys Leu Tyr  
                                   245                                  250                                  255  
 Asn Gln Ala Arg Val Lys Tyr Ser Leu  
                                   260                                  265

<210> 24  
 <211> 265  
 <212> PRT  
 <213> Vesicular stomatitis virus

<400> 24  
 Met Asp Asn Leu Thr Lys Val Arg Glu Tyr Leu Lys Ser Tyr Ser Arg  
                   1                                  5                                  10                                  15  
 Leu Asp Gln Ala Val Gly Glu Ile Asp Glu Ile Glu Ala Gln Arg Ala  
                                   20                                  25                                  30

Glu Lys Ser Asn Tyr Glu Leu Phe Gln Glu Asp Gly Val Glu Glu His  
 35 40 45  
 Thr Arg Pro Ser Tyr Phe Gln Ala Ala Asp Asp Ser Asp Thr Glu Ser  
 50 55 60  
 Glu Pro Glu Ile Glu Asp Asn Gln Gly Leu Tyr Val Pro Asp Pro Glu  
 65 70 75 80  
 Ala Glu Gln Val Glu Gly Phe Ile Gln Gly Pro Leu Asp Asp Tyr Ala  
 85 90 95  
 Asp Glu Asp Val Asp Val Val Phe Thr Ser Asp Trp Lys Gln Pro Glu  
 100 105 110  
 Leu Glu Ser Asp Glu His Gly Lys Thr Leu Arg Leu Thr Leu Pro Glu  
 115 120 125  
 Gly Leu Ser Gly Glu Gln Lys Ser Gln Trp Leu Leu Thr Ile Lys Ala  
 130 135 140  
 Val Val Gln Ser Ala Lys His Trp Asn Leu Ala Glu Cys Thr Phe Glu  
 145 150 155 160  
 Ala Ser Gly Glu Gly Val Ile Ile Lys Lys Arg Gln Ile Thr Pro Asp  
 165 170 175  
 Val Tyr Lys Val Thr Pro Val Met Asn Thr His Pro Ser Gln Ser Glu  
 180 185 190  
 Ala Val Ser Asp Val Trp Ser Leu Ser Lys Thr Ser Met Thr Phe Gln  
 195 200 205  
 Pro Lys Lys Ala Ser Leu Gln Pro Leu Thr Ile Ser Leu Asp Glu Leu  
 210 215 220  
 Phe Ser Ser Arg Gly Glu Phe Ile Ser Val Gly Gly Asn Gly Arg Met  
 225 230 235 240  
 Ser His Lys Glu Ala Ile Leu Leu Gly Leu Arg Tyr Lys Lys Leu Tyr  
 245 250 255  
 Asn Gln Ala Arg Val Lys Tyr Ser Leu  
 260 265

<210> 25  
 <211> 190  
 <212> PRT  
 <213> Vesicular stomatitis virus

<400> 25  
 Met Asp Asn Leu Thr Lys Val Arg Glu Tyr Leu Lys Ser Tyr Ser Arg  
 1 5 10 15  
 Leu Asp Gln Ala Val Gly Glu Ile Asp Glu Ile Glu Ala Gln Arg Ala

20                      25                      30  
 Glu Lys Ser Asn Tyr Glu Leu Phe Gln Glu Asp Gly Val Glu Glu His  
                     35                      40                      45  
 Thr Arg Pro Ser Tyr Phe Gln Ala Ala Asp Asp Ser Asp Thr Glu Ser  
                     50                      55                      60  
 Glu Pro Glu Ile Glu Asp Asn Gln Gly Leu Tyr Val Pro Asp Pro Glu  
                     65                      70                      75                      80  
 Ala Glu Gln Val Glu Gly Phe Ile Gln Gly Pro Leu Asp Asp Tyr Ala  
                     85                      90                      95  
 Asp Glu Asp Val Asp Val Val Phe Thr Ser Asp Trp Lys Gln Pro Glu  
                     100                      105                      110  
 Leu Glu Ser Asp Glu His Gly Lys Thr Leu Arg Leu Thr Leu Pro Glu  
                     115                      120                      125  
 Gly Leu Ser Gly Glu Gln Lys Ser Gln Trp Leu Leu Thr Ile Lys Ala  
                     130                      135                      140  
 Val Val Gln Ser Ala Lys His Trp Asn Leu Ala Glu Cys Thr Phe Glu  
                     145                      150                      155                      160  
 Ala Ser Gly Glu Gly Val Ile Ile Lys Lys Arg Gln Ile Thr Pro Asp  
                     165                      170                      175  
 Val Tyr Lys Val Thr Pro Val Met Asn Thr His Pro Ser Gln  
                     180                      185                      190

<210> 26  
 <211> 265  
 <212> PRT  
 <213> Vesicular stomatitis virus

<400> 26  
 Met Asp Asn Leu Thr Lys Val Arg Glu Tyr Leu Lys Ser Tyr Ser Arg  
                     1                      5                      10                      15  
 Leu Asp Gln Ala Val Gly Glu Ile Asp Glu Ile Glu Ala Gln Arg Ala  
                     20                      25                      30  
 Glu Lys Ser Asn Tyr Glu Leu Phe Gln Glu Asp Gly Val Glu Glu His  
                     35                      40                      45  
 Thr Arg Pro Ser Tyr Phe Gln Ala Ala Asp Asp Ser Asp Thr Glu Ser  
                     50                      55                      60  
 Glu Pro Glu Ile Glu Asp Asn Gln Gly Leu Tyr Val Pro Asp Pro Glu  
                     65                      70                      75                      80  
 Ala Glu Gln Val Glu Gly Phe Ile Gln Gly Pro Leu Asp Asp Tyr Ala  
                     85                      90                      95



Asp Glu Asp Val Asp Val Val Phe Thr Ser Asp Trp Lys Gln Pro Glu  
100 105 110

Leu Glu Ser Asp Glu His Gly Lys Thr Leu Arg Leu Thr Leu Pro Glu  
115 120 125

Gly Leu Ser Gly Glu Gln Lys Ser Gln Trp Leu Leu Thr Ile Lys Ala  
130 135 140

Val Val Gln Ser Ala Lys His Trp Asn Leu Ala Glu Cys Thr Phe Glu  
145 150 155 160

Ala Ser Gly Glu Gly Val Ile Ile Lys Lys Arg Gln Ile Thr Pro Asp  
165 170 175

Val Tyr Lys Val Thr Pro Val Met Asn Thr His Pro Ser Gln Ser Glu  
180 185 190

Ala Val Ser Asp Val Trp Ser Leu Ser Lys Thr Ser Met Thr Phe Gln  
195 200 205

Pro Lys Lys Ala Ser Leu Gln Pro Leu Thr Ile Ser Leu Asp Glu Leu  
210 215 220

Phe Ser Ser Arg Gly Glu Phe Ile Ser Val Gly Gly Asn Gly Arg Met  
225 230 235 240

Ser His Lys Glu Ala Ile Leu Leu Gly Leu Arg Tyr Lys Lys Leu Tyr  
245 250 255

Asn Gln Ala Arg Val Lys Tyr Ser Leu  
260 265

<210> 27

<211> 265

<212> PRT

<213> Vesicular stomatitis virus

<400> 27

Met Asp Asn Leu Thr Lys Val Arg Glu Tyr Leu Lys Ser Tyr Ser Arg  
1 5 10 15

Leu Asp Gln Ala Val Gly Glu Ile Asp Glu Ile Glu Ala Gln Arg Ala  
20 25 30

Glu Lys Ser Asn Tyr Glu Leu Phe Gln Glu Asp Gly Val Glu Glu His  
35 40 45

Thr Arg Pro Ser Tyr Phe Gln Ala Ala Asp Asp Ser Asp Thr Glu Ser  
50 55 60

Glu Pro Glu Ile Glu Asp Asn Gln Gly Leu Tyr Val Pro Asp Pro Glu  
65 70 75 80

Ala Glu Gln Val Glu Gly Phe Ile Gln Gly Pro Leu Asp Asp Tyr Ala  
85 90 95

Asp Glu Asp Val Asp Val Val Phe Thr Ser Asp Trp Lys Gln Pro Glu  
100 105 110

Leu Glu Ser Asp Glu His Gly Lys Thr Leu Arg Leu Thr Leu Pro Glu  
115 120 125

Gly Leu Ser Gly Glu Gln Lys Ser Gln Trp Leu Leu Thr Ile Lys Ala  
130 135 140

Val Val Gln Ser Ala Lys His Trp Asn Leu Ala Glu Cys Thr Phe Glu  
145 150 155 160

Ala Ser Gly Glu Gly Val Ile Ile Lys Lys Arg Gln Ile Thr Pro Asp  
165 170 175

Val Tyr Lys Val Thr Pro Val Met Asn Thr His Pro Ser Gln Ser Glu  
180 185 190

Ala Val Ser Asp Val Trp Ser Leu Ser Lys Thr Ser Met Thr Phe Gln  
195 200 205

Pro Lys Lys Ala Ser Leu Gln Pro Leu Thr Ile Ser Leu Asp Glu Leu  
210 215 220

Phe Ser Ser Arg Gly Glu Phe Ile Ser Val Gly Gly Asn Gly Arg Met  
225 230 235 240

Ser His Lys Glu Ala Ile Leu Leu Gly Leu Arg Tyr Lys Lys Leu Tyr  
245 250 255

Asn Gln Ala Arg Val Lys Tyr Ser Leu  
260 265

<210> 28

<211> 690

<212> DNA

<213> Vesicular stomatitis virus

<400> 28

atgagttcct taaagaagat tctcgggtctg aaggggaaag gtaagaaatc taagaaatta 60  
gggatcgcac cacccttga tgaagaggac actagcatgg agtatgctcc gagcgctcca 120  
attgacaaat cctatttttg agttgacgag atggacacct atgatccgaa tcaattaaga 180  
tatgagaaat tcttctttac agtgaaaatg acgggttagat ctaatcgctcc gttcagaaca 240  
tactcagatg tggcagccgc tgtatcccat tgggatcaca tgtacatcgg aatggcaggg 300  
aaacgtccct tctacaaaat cttggctttt ttgggttctt ctaatctaaa ggccactcca 360  
gcggtatttg cagatcaagg tcaaccagag tatcacactc actgcgaagg cagggcttat 420  
ttgccacata ggatggggaa gaccctccc atgctcaatg taccagagca cttcagaaga 480  
ccattcaata taggtcttta caagggaacg attgagctca caatgacat ctacgatgat 540  
gagtcactgg aagcagctcc tatgatctgg gatcatttca attcttccaa attttctgat 600  
ttcagagaga aggccttaat gtttggcctg attgtcgaga aaaaggcatc tggagcgtgg 660  
gtcctggatt ctatcagcca cttcaaata 690

<210> 29

<211> 690

<212> DNA

<213> Vesicular stomatitis virus

<400> 29

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atgagttcct taaagaagat tctcggctctg aaggggaaag gtaagaaatc taagaaatta 60
gggatcgcac cacccttcta tgaagaggac actaacatgg agtatgctcc gagcgctcca 120
attgacaaat cctatttttg agttgacgag atggacactc atgatccgca tcaattaaga 180
tatgagaaat tcttctttac agtgaaaatg acggtttagat ctaatcgctc gttcagaaca 240
tactcagatg tggcagccgc tgtatcccat tgggatcaca tgtacatcgg aatggcaggg 300
aaacgtccct tctacaagat cttggctttt ttgggttctt ctaatctaaa ggccactcca 360
gcggtattgg cagatcaagg tcaaccagag tatcacgctc actgtgaagg cagggcttat 420
ttgccacaca gaatggggaa gaccctccc atgctcaatg taccagagca cttcagaaga 480
ccattcaata taggtcttta caagggaacg gttgagctca caatgaccat ctacgatgat 540
gagtcactgg aagcagctcc tatgatctgg gatcatttca attcttccaa attttctgat 600
ttcagagaga aggccttaat gtttggcctg attgtcgaga aaaaggcatc tggagcttgg 660
gtcctggatt ctgtcagcca cttcaaatga 690
```

<210> 30

<211> 690

<212> DNA

<213> Vesicular stomatitis virus

<400> 30

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atgagttcct taaagaagat tctcggctctg aaggggaaag gtaagaaatc taagaaatta 60
gggatcgcac cacccttcta tgaagaggac actaacatgg agtatgctcc gagcgctcca 120
attgacaaat cctatttttg agttgacgag agggacactc atgatccgca tcaattaaga 180
tatgagaaat tcttctttac agtgaaaatg acggtttagat ctaatcgctc gttcagaaca 240
tactcagatg tggcagccgc tgtatcccat tgggatcaca tgtacatcgg aatggcaggg 300
aaacgtccct tctacaagat cttggctttt ttgggttctt ctaatctaaa ggccactcca 360
gcggtattgg cagatcaagg tcaaccagag tatcacgctc actgtgaagg cagggcttat 420
ttgccacaca gaatggggaa gaccctccc atgctcaatg taccagagca cttcagaaga 480
ccattcaata taggtcttta caagggaacg gttgagctca caatgaccat ctacgatgat 540
gagtcactgg aagcagctcc tatgatctgg gatcatttca attcttccaa attttctgat 600
ttcagagaga aggccttaat gtttggcctg attgtcgaga aaaaggcatc tggagcttgg 660
gtcctggatt ctgtcagcca cttcaaatga 690
```

<210> 31

<211> 690

<212> DNA

<213> Vesicular stomatitis virus

<400> 31

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atgagttcct taaagaagat tctcggctctg aaggggaaag gtaagaaatc taagaaatta 60
gggatcgcac cacccttcta tgaagaggac actaacatgg agtatgctcc gagcgctcca 120
attgacaaat cctatttttg agttgacgag atggacactc atgatccgca tcaattaaga 180
tatgagaaat tcttctttac agtgaaaatg acggtttagat ctaatcgctc gttcagaaca 240
tactcagatg tggcagccgc tgtatcccat tgggatcaca tgtacatcgg aatggcaggg 300
aaacgtccct tctacaagat cttggctttt ttgggttctt ctaatctaaa ggccactcca 360
gcggtattgg cagatcaagg tcaaccagag tatcacgctc actgtgaagg cagggcttat 420
ttgccacaca gaatggggaa gaccctccc atgctcaatg taccagagca cttcagaaga 480
ccattcaata taggtcttta caagggaacg gttgagctca caatgaccat ctacgatgat 540
gagtcactgg aagcagctcc tatgatctgg gatcatttca attcttccaa attttctgat 600
ttcagagaga aggccttaat gtttggcctg attgtcgaga aaaaggcatc tggagcttgg 660
gtcctggatt ctgtcagcca cttcaaatga 690
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<210> 32  
<211> 229  
<212> PRT  
<213> Vesicular stomatitis virus

<400> 32  
Met Ser Ser Leu Lys Lys Ile Leu Gly Leu Lys Gly Lys Gly Lys Lys  
1 5 10 15  
Ser Lys Lys Leu Gly Ile Ala Pro Pro Tyr Glu Glu Asp Thr Ser  
20 25 30  
Met Glu Tyr Ala Pro Ser Ala Pro Ile Asp Lys Ser Tyr Phe Gly Val  
35 40 45  
Asp Glu Met Asp Thr Tyr Asp Pro Asn Gln Leu Arg Tyr Glu Lys Phe  
50 55 60  
Phe Phe Thr Val Lys Met Thr Val Arg Ser Asn Arg Pro Phe Arg Thr  
65 70 75 80  
Tyr Ser Asp Val Ala Ala Ala Val Ser His Trp Asp His Met Tyr Ile  
85 90 95  
Gly Met Ala Gly Lys Arg Pro Phe Tyr Lys Ile Leu Ala Phe Leu Gly  
100 105 110  
Ser Ser Asn Leu Lys Ala Thr Pro Ala Val Leu Ala Asp Gln Gly Gln  
115 120 125  
Pro Glu Tyr His Thr His Cys Glu Gly Arg Ala Tyr Leu Pro His Arg  
130 135 140  
Met Gly Lys Thr Pro Pro Met Leu Asn Val Pro Glu His Phe Arg Arg  
145 150 155 160  
Pro Phe Asn Ile Gly Leu Tyr Lys Gly Thr Ile Glu Leu Thr Met Thr  
165 170 175  
Ile Tyr Asp Asp Glu Ser Leu Glu Ala Ala Pro Met Ile Trp Asp His  
180 185 190  
Phe Asn Ser Ser Lys Phe Ser Asp Phe Arg Glu Lys Ala Leu Met Phe  
195 200 205  
Gly Leu Ile Val Glu Lys Lys Ala Ser Gly Ala Trp Val Leu Asp Ser  
210 215 220  
Ile Ser His Phe Lys  
225

<210> 33  
<211> 229  
<212> PRT  
<213> Vesicular stomatitis virus

<400> 33

Met Ser Ser Leu Lys Lys Ile Leu Gly Leu Lys Gly Lys Gly Lys Lys  
1 5 10 15

Ser Lys Lys Leu Gly Ile Ala Pro Pro Pro Tyr Glu Glu Asp Thr Asn  
20 25 30

Met Glu Tyr Ala Pro Ser Ala Pro Ile Asp Lys Ser Tyr Phe Gly Val  
35 40 45

Asp Glu Met Asp Thr His Asp Pro His Gln Leu Arg Tyr Glu Lys Phe  
50 55 60

Phe Phe Thr Val Lys Met Thr Val Arg Ser Asn Arg Pro Phe Arg Thr  
65 70 75 80

Tyr Ser Asp Val Ala Ala Ala Val Ser His Trp Asp His Met Tyr Ile  
85 90 95

Gly Met Ala Gly Lys Arg Pro Phe Tyr Lys Ile Leu Ala Phe Leu Gly  
100 105 110

Ser Ser Asn Leu Lys Ala Thr Pro Ala Val Leu Ala Asp Gln Gly Gln  
115 120 125

Pro Glu Tyr His Ala His Cys Glu Gly Arg Ala Tyr Leu Pro His Arg  
130 135 140

Met Gly Lys Thr Pro Pro Met Leu Asn Val Pro Glu His Phe Arg Arg  
145 150 155 160

Pro Phe Asn Ile Gly Leu Tyr Lys Gly Thr Val Glu Leu Thr Met Thr  
165 170 175

Ile Tyr Asp Asp Glu Ser Leu Glu Ala Ala Pro Met Ile Trp Asp His  
180 185 190

Phe Asn Ser Ser Lys Phe Ser Asp Phe Arg Glu Lys Ala Leu Met Phe  
195 200 205

Gly Leu Ile Val Glu Lys Lys Ala Ser Gly Ala Trp Val Leu Asp Ser  
210 215 220

Val Ser His Phe Lys  
225

<210> 34

<211> 229

<212> PRT

<213> Vesicular stomatitis virus

<400> 34

Met Ser Ser Leu Lys Lys Ile Leu Gly Leu Lys Gly Lys Gly Lys Lys  
1 5 10 15

Ser Lys Lys Leu Gly Ile Ala Pro Pro Pro Tyr Glu Glu Asp Thr Asn  
20 25 30

Met Glu Tyr Ala Pro Ser Ala Pro Ile Asp Lys Ser Tyr Phe Gly Val  
35 40 45

Asp Glu Met Asp Thr His Asp Pro His Gln Leu Arg Tyr Glu Lys Phe  
50 55 60

Phe Phe Thr Val Lys Met Thr Val Arg Ser Asn Arg Pro Phe Arg Thr  
65 70 75 80

Tyr Ser Asp Val Ala Ala Val Ser His Trp Asp His Met Tyr Ile  
85 90 95

Gly Met Ala Gly Lys Arg Pro Phe Tyr Lys Ile Leu Ala Phe Leu Gly  
100 105 110

Ser Ser Asn Leu Lys Ala Thr Pro Ala Val Leu Ala Asp Gln Gly Gln  
115 120 125

Pro Glu Tyr His Ala His Cys Glu Gly Arg Ala Tyr Leu Pro His Arg  
130 135 140

Met Gly Lys Thr Pro Pro Met Leu Asn Val Pro Glu His Phe Arg Arg  
145 150 155 160

Pro Phe Asn Ile Gly Leu Tyr Lys Gly Thr Val Glu Leu Thr Met Thr  
165 170 175

Ile Tyr Asp Asp Glu Ser Leu Glu Ala Ala Pro Met Ile Trp Asp His  
180 185 190

Phe Asn Ser Ser Lys Phe Ser Asp Phe Arg Glu Lys Ala Leu Met Phe  
195 200 205

Gly Leu Ile Val Glu Lys Lys Ala Ser Gly Ala Trp Val Leu Asp Ser  
210 215 220

Val Ser His Phe Lys  
225

<210> 35

<211> 229

<212> PRT

<213> Vesicular stomatitis virus

<400> 35

Met Ser Ser Leu Lys Lys Ile Leu Gly Leu Lys Gly Lys Gly Lys Lys  
1 5 10 15

Ser Lys Lys Leu Gly Ile Ala Pro Pro Pro Tyr Glu Glu Asp Thr Asn  
20 25 30

Met Glu Tyr Ala Pro Ser Ala Pro Ile Asp Lys Ser Tyr Phe Gly Val  
35 40 45

Asp Glu Arg Asp Thr His Asp Pro His Gln Leu Arg Tyr Glu Lys Phe  
 50 55 60  
 Phe Phe Thr Val Lys Met Thr Val Arg Ser Asn Arg Pro Phe Arg Thr  
 65 70 75 80  
 Tyr Ser Asp Val Ala Ala Val Ser His Trp Asp His Met Tyr Ile  
 85 90 95  
 Gly Met Ala Gly Lys Arg Pro Phe Tyr Lys Ile Leu Ala Phe Leu Gly  
 100 105 110  
 Ser Ser Asn Leu Lys Ala Thr Pro Ala Val Leu Ala Asp Gln Gly Gln  
 115 120 125  
 Pro Glu Tyr His Ala His Cys Glu Gly Arg Ala Tyr Leu Pro His Arg  
 130 135 140  
 Met Gly Lys Thr Pro Pro Met Leu Asn Val Pro Glu His Phe Arg Arg  
 145 150 155 160  
 Pro Phe Asn Ile Gly Leu Tyr Lys Gly Thr Val Glu Leu Thr Met Thr  
 165 170 175  
 Ile Tyr Asp Asp Glu Ser Leu Glu Ala Ala Pro Met Ile Trp Asp His  
 180 185 190  
 Phe Asn Ser Ser Lys Phe Ser Asp Phe Arg Glu Lys Ala Leu Met Phe  
 195 200 205  
 Gly Leu Ile Val Glu Lys Lys Ala Ser Gly Ala Trp Val Leu Asp Ser  
 210 215 220  
 Val Ser His Phe Lys  
 225

<210> 36  
 <211> 1536  
 <212> DNA  
 <213> Vesicular stomatitis virus

<400> 36  
 atgaagtgcc ttttgtactt agccttttta ttcattgggg tgaattgcaa gttcaccata 60  
 gtttttccac acaaccaaaa aggaaactgg aaaaatgttc cttctaatta ccattattgc 120  
 ccgtcaagct cagatttaaa ttggcataat gacttaatag gcacagccat acaagtcaaa 180  
 atgccaaga gtcacaaggc tattcaagca gacggttgga tgtgtcatgc ttccaaatgg 240  
 gtcactactt gtgatttccg ctggtatgga ccgaagtata taacacagtc catccgatcc 300  
 ttcactccat ctgtagaaca atgcaaggaa agcattgaac aaacgaaaca aggaacttgg 360  
 ctgaatccag gcttccctcc tcaaagttgt ggatattgcaa ctgtgacgga tgccgaagca 420  
 gtgattgtcc aggtgactcc tcaccatgtg ctggttgatg aatacacagg agaatgggtt 480  
 gattcacagt tcatcaacgg aaaatgcagc aattacatat gccccactgt ccataactct 540  
 acaacctggc attctgacta taagggtcaaa gggctatgtg attctaact catttccatg 600  
 gacatcacct tcttctcaga ggacggagag ctatcatccc tgggaaagga gggcacaggg 660  
 ttcagaagta actactttgc ttatgaaact ggaggcaagg cctgcaaaat gcaatactgc 720  
 aagcattggg gagtcagact cccatcaggt gtctgggtcg agatggctga taaggatctc 780

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tttgcgtcag ccagattccc tgaatgccca gaaggggtcaa gtatctctgc tccatctcag 840
acctcagtgg atgtaagtct aattcaggac gttgagagga tcttgatta tccctctgc 900
caagaaacct ggagcaaaat cagagcgggt cttccaatct ctccagtggg tctcagctat 960
cttgcctcta aaaacccagg aaccggtcct gctttcacca taatcaatgg taccctaaaa 1020
tactttgaga ccagatacat cagagtcgat attgctgctc caatcctctc aagaatgggc 1080
ggaatgatca gtggaactac cacagaaagg gaactgtggg atgactgggc accatatgaa 1140
gacgtggaaa ttggacccaa tggagtcttg aggaccagtt caggatataa gtttccttta 1200
tacatgattg gacatggtat gttggactcc gatcttcac ttagctcaaa ggctcaggtg 1260
ttcgaacatc ctcacattca agacgctgct tgcgaacttc ctgatgatga gagtttattt 1320
tttggtgata ctgggctatc caaaaatcca atcgagcttg tagaagggtg gttcagtagt 1380
tggaagagct ctattgcctc ttttttcttt atcatagggt taatcattgg actattcttg 1440
gttctccgag ttggtatcca tctttgcatt aaattaaagc acaccaagaa aagacagatt 1500
tatacagaca tagagatgaa ccgacttggg aagtaa 1536

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<210> 37

<211> 885

<212> DNA

<213> Vesicular stomatitis virus

<220>

<221> modified\_base

<222> (1)..(885)

<223> "n" represents a, t, c, g, other or unknown

<400> 37

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atgaagtgcc ttttgkactt agctttttta ttcacgagg tgaattgcaa gttcaccata 60
gtttttccat acaacaaaaa aggaaactgg aaaaatgttc cttccaatta ccattattgc 120
ccgtcaagct cagattttaa ttgncataat gacttaatag gcacagcctt acaagtcaaa 180
atgcccaga gtcacaaggc tattcaagca gacggttgga tgtgtcatgc ttccaaatgg 240
gtcactactt gtgatttccg ctggtacgga ccgaagtata taacacattc catccgatcc 300
ttcactccat ctgtagaaca atgcaaggaa agcattgaac aaacgaaaca aggaacttgg 360
ctgaatccag gcttccctcc tcaaagtgtg ggatatgcaa ctgtgacgga tgctgaagca 420
gcgattgtcc aggtgactcc tcacatgtg cttgttgatg aatacacagg agaatgggtt 480
gattcacagt tcatcaacgg aaaatgcagc aatgacatg gccccactgt ccataactcc 540
acaacctggc attccgacta taaggtcaaa gggctatgtg attctaacct catttccatg 600
gacatcacct tcttctcaga ggacggagag ctatcatccc taggaaagga gggcacaggg 660
ttcagaagta actactttgc ttatgaaact ggagacaagg cctgcaaaat gcagtactgc 720
aagcgttggg gagtcagact cccatcaggt gtctggttcg agatggctga taaggatctc 780
tttgcgtcag ccagattccc tgaatgccca gaaggggtcaa gtatctctgc tccatctcag 840
acctcagtgg atgtaagtct cattcaggac gttgagagga tcttg 885

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<210> 38

<211> 705

<212> DNA

<213> Vesicular stomatitis virus

<400> 38

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ccatctcaga cctcagtggg tgtaagtctc attcaggacg ttgagaggat cttggattat 60
tccctctgcc aagaaacctg gagcaaaatc agagcgggtc ttcccatctc tccagtggat 120
ctcagctatc ttgctcctaa aaacccagga accggtcctg tctttaccat aatcaatgg 180
accctaaaat actttgagac cagatacatc agagtcgata ttgctgctcc aatcctctca 240
agaatggctg gaatgatcag tggaactacc acagaaaggg aactgtggga tgactgggct 300
ccatatgaag acgtggaaat tggacccaat ggagttctga ggaccagttc aggatataag 360
tttctttat atatgattgg acatggtatg ttggactccg atcttcatct tagctcaaag 420
gctcagggtg ttgaacatcc tcacattcaa gacgctgctt cgcagcttcc tgatgatgag 480

```



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actttatttt ttggtgatac tgggctatcc aaaaatccaa tcgagtttgt agaaggttgg 540
ttcagtagtt ggaagagctc tattgcctct tttttcttta tcataggtt aatcattgga 600
ctattcttgg ttctccgagt tggatattat ctttgcatta aattaaagca caccaagaaa 660
agacagattt atacagacat agagatgaac cgacttgga agtaa 705

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<210> 39
<211> 1536
<212> DNA
<213> Vesicular stomatitis virus

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```

<400> 39
atgaagtgcc ttttgtactt agctttttta ttcacgagg tgaattgcaa gttcaccata 60
gtttttccat acaaccgaaa aggaaactgg aaaaatgttc cttccaatta ccattattgc 120
ccgtcaagct cagattttaa ttggcataat gacttaatag gcacagcctt acaagtcaaa 180
atgcccaaga gtcacaaggc tattcaagca gacggttgg tgtgtcatgc ttccaaatgg 240
gtcactactt gtgatttccg ctggtacgga ccgaagtata taacacattc catccgatcc 300
ttcactccat ctgtagaaca atgcaaggaa agcattgaac aaacgaaaca aggaacttgg 360
ctgaatccag gcttcctcc tcaaagttgt ggatatgcaa ctgtgacgga tgctgaagca 420
gcgattgtcc aggtgactcc tcaccatgtg cttgttgatg aatacacagg agaatgggtt 480
gattcacagt tcatcaacgg aaaatgcagc aatgacatat gcccactgt ccataactcc 540
acaacctggc attccgacta taagggtcaaa gggctatgtg attctaacct catttccatg 600
gacatcacct tcttctcaga ggacggagag ctatcatccc taggaaagga gggcacaggg 660
ttcagaagta actactttgc ttatgaaact ggagacaagg cctgcaaaat gcagtactgc 720
aagcattggg gagtcagact cccatcaggt gtctgggtcg agatggctga taaggatctc 780
tttgctgcag ccagattccc tgaatgcccc gaaggggtcaa gtatctctgc tccatctcag 840
acctcagtg atgtaagtct cattcaggac gttgagagga tcttgatta ttccctctgc 900
caagaaacct ggagcaaaat cagagcgggt cttcccatct ctccagtgga tctcagctat 960
cttgctccta aaaaccagg aaccggctct gctttcacca taatcaatgg taccctaaaa 1020
tactttgaga ccagatacat cagagtcgat attgtgtct caatcctctc aagaatgggtc 1080
ggaatgatca gtggaactac cacagaaagg gaactgtggg atgactgggc tccatattgaa 1140
gacgtggaaa ttggaccaa tggagttctg aggaccagtt caggatataa gtttccttta 1200
tatatgattg gacatggtat gttggactcc gatcttcac ttagctcaaa ggctcaggtg 1260
tttgaacatc ctcacattca agacgctght gcgcagcttc ctgatgatga gactttattt 1320
tttggtgata ctgggctatc caaaaatcca atcgagtttg tagaagggtt gttcagtagt 1380
tggaagagct ctattgcctc ttttttcttt atcataggtt taatcattgg actattcttg 1440
gttctccgag ttggtattta tctttgcatt aaattaaagc acaccaagaa aagacagatt 1500
tatacacaga tagagatgaa ccgacttgga aagtaa 1536

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<210> 40
<211> 1399
<212> DNA
<213> Vesicular stomatitis virus

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```

<400> 40
atgaagtgcc ttttgtactt agctttttta ttcacgagg tgaattgcaa gttcaccata 60
gtttttccat acaaccaaaa aggaaactgg aaaaatgttc cttccaatta ccattattgc 120
ccgtcaagct cagattttaa ttggcataat gacttaatag gcacagcctt acaggtcaaa 180
atgcccaaga gtcacaaggc tattcaagca gacggttgg tgtgtcatgc ttccaaatgg 240
gtcactactt gtgatttccg ctggtacgga ccgaagtata taacacattc catccgatcc 300
ttcactccat ctgtagaaca atgcaaggaa agcattgaac aaacgaaaca aggaacttgg 360
ctgaatccag gcttcctcc tcaaagttgt ggatatgcaa ctgtgacgga tgctgaagca 420
gcgattgtcc aggtgactcc tcaccatgtg cttgttgatg aatacacagg agaatgggtt 480
gattcacagt tcatcaacgg aaaatgcagc aatgacatat gcccactgt ccataactcc 540
acaacctggc attccgacta taagggtcaaa gggctatgtg attctaacct catttccatg 600
gacatcacct tcttctcaga ggacggagag ctatcatccc taggaaagga gggcacaggg 660

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ttcagaagta actactttgc ttatgaaact ggagacaagg cctgcaaaat gcagtactgc 720  
 aagcggttggg gagtcagact cccatcaggt gtctgggtcg ggatggctga taaggatctc 780  
 tttgctgcag ccagattccc tgaatgcccga gaaggggtcaa gtatctctgc tccatctcag 840  
 acctcagtggt atgtaagtct cattcaggac gttgagagga tcttactttg agaccagata 900  
 catcagagtc gatattgctg ctccaatcct ctcaagaatg gtcggaatga tcagtggaac 960  
 taccacagaa agggaaactgt gggatgactg ggctccatat gaagacgtgg aaattggacc 1020  
 caatggagtt ctgaggacca gttcaggata taagtttcct ttatatatga ttggacatgg 1080  
 tatgttggac tccgatcttc atcttagctc aaaggctcag gtgtttgaac atcctcacat 1140  
 tcaagacgct gcttcgcagc ttcctgatga tgagacttta ttttttgggtg atactgggct 1200  
 atccaaaaat ccaatcgagt ttgtagaagg ttggttcagt agttggaaga gctctattgc 1260  
 ctcttttttc tttatcatag ggttaatcat tggactattc ttggttctcc gagttggat 1320  
 ttatctttgc attaaattaa agcacaccaa gaaaagacag atttatacag acatagagat 1380  
 gaaccgactt gggaagtaa 1399

<210> 41  
 <211> 511  
 <212> PRT  
 <213> Vesicular stomatitis virus

<400> 41  
 Met Lys Cys Leu Leu Tyr Leu Ala Phe Leu Phe Ile Gly Val Asn Cys  
 1 5 10 15  
 Lys Phe Thr Ile Val Phe Pro His Asn Gln Lys Gly Asn Trp Lys Asn  
 20 25 30  
 Val Pro Ser Asn Tyr His Tyr Cys Pro Ser Ser Ser Asp Leu Asn Trp  
 35 40 45  
 His Asn Asp Leu Ile Gly Thr Ala Ile Gln Val Lys Met Pro Lys Ser  
 50 55 60  
 His Lys Ala Ile Gln Ala Asp Gly Trp Met Cys His Ala Ser Lys Trp  
 65 70 75 80  
 Val Thr Thr Cys Asp Phe Arg Trp Tyr Gly Pro Lys Tyr Ile Thr Gln  
 85 90 95  
 Ser Ile Arg Ser Phe Thr Pro Ser Val Glu Gln Cys Lys Glu Ser Ile  
 100 105 110  
 Glu Gln Thr Lys Gln Gly Thr Trp Leu Asn Pro Gly Phe Pro Pro Gln  
 115 120 125  
 Ser Cys Gly Tyr Ala Thr Val Thr Asp Ala Glu Ala Val Ile Val Gln  
 130 135 140  
 Val Thr Pro His His Val Leu Val Asp Glu Tyr Thr Gly Glu Trp Val  
 145 150 155 160  
 Asp Ser Gln Phe Ile Asn Gly Lys Cys Ser Asn Tyr Ile Cys Pro Thr  
 165 170 175  
 Val His Asn Ser Thr Thr Trp His Ser Asp Tyr Lys Val Lys Gly Leu  
 180 185 190

Cys Asp Ser Asn Leu Ile Ser Met Asp Ile Thr Phe Phe Ser Glu Asp  
 195 200 205  
 Gly Glu Leu Ser Ser Leu Gly Lys Glu Gly Thr Gly Phe Arg Ser Asn  
 210 215 220  
 Tyr Phe Ala Tyr Glu Thr Gly Gly Lys Ala Cys Lys Met Gln Tyr Cys  
 225 230 235 240  
 Lys His Trp Gly Val Arg Leu Pro Ser Gly Val Trp Phe Glu Met Ala  
 245 250 255  
 Asp Lys Asp Leu Phe Ala Ala Ala Arg Phe Pro Glu Cys Pro Glu Gly  
 260 265 270  
 Ser Ser Ile Ser Ala Pro Ser Gln Thr Ser Val Asp Val Ser Leu Ile  
 275 280 285  
 Gln Asp Val Glu Arg Ile Leu Asp Tyr Ser Leu Cys Gln Glu Thr Trp  
 290 295 300  
 Ser Lys Ile Arg Ala Gly Leu Pro Ile Ser Pro Val Asp Leu Ser Tyr  
 305 310 315 320  
 Leu Ala Pro Lys Asn Pro Gly Thr Gly Pro Ala Phe Thr Ile Ile Asn  
 325 330 335  
 Gly Thr Leu Lys Tyr Phe Glu Thr Arg Tyr Ile Arg Val Asp Ile Ala  
 340 345 350  
 Ala Pro Ile Leu Ser Arg Met Val Gly Met Ile Ser Gly Thr Thr Thr  
 355 360 365  
 Glu Arg Glu Leu Trp Asp Asp Trp Ala Pro Tyr Glu Asp Val Glu Ile  
 370 375 380  
 Gly Pro Asn Gly Val Leu Arg Thr Ser Ser Gly Tyr Lys Phe Pro Leu  
 385 390 395 400  
 Tyr Met Ile Gly His Gly Met Leu Asp Ser Asp Leu His Leu Ser Ser  
 405 410 415  
 Lys Ala Gln Val Phe Glu His Pro His Ile Gln Asp Ala Ala Ser Gln  
 420 425 430  
 Leu Pro Asp Asp Glu Ser Leu Phe Phe Gly Asp Thr Gly Leu Ser Lys  
 435 440 445  
 Asn Pro Ile Glu Leu Val Glu Gly Trp Phe Ser Ser Trp Lys Ser Ser  
 450 455 460  
 Ile Ala Ser Phe Phe Phe Ile Ile Gly Leu Ile Ile Gly Leu Phe Leu  
 465 470 475 480  
 Val Leu Arg Val Gly Ile His Leu Cys Ile Lys Leu Lys His Thr Lys  
 485 490 495

Lys Arg Gln Ile Tyr Thr Asp Ile Glu Met Asn Arg Leu Gly Lys  
500 505 510

<210> 42  
<211> 295  
<212> PRT  
<213> Vesicular stomatitis virus

<220>  
<221> MOD\_RES  
<222> (1)..(295)  
<223> "Xaa" represents any, other or unknown amino acid

<400> 42  
Met Lys Cys Leu Leu Xaa Leu Ala Phe Leu Phe Ile Gly Val Asn Cys  
1 5 10 15

Lys Phe Thr Ile Val Phe Pro Tyr Asn Gln Lys Gly Asn Trp Lys Asn  
20 25 30

Val Pro Ser Asn Tyr His Tyr Cys Pro Ser Ser Ser Asp Leu Asn Xaa  
35 40 45

His Asn Asp Leu Ile Gly Thr Ala Leu Gln Val Lys Met Pro Lys Ser  
50 55 60

His Lys Ala Ile Gln Ala Asp Gly Trp Met Cys His Ala Ser Lys Trp  
65 70 75 80

Val Thr Thr Cys Asp Phe Arg Trp Tyr Gly Pro Lys Tyr Ile Thr His  
85 90 95

Ser Ile Arg Ser Phe Thr Pro Ser Val Glu Gln Cys Lys Glu Ser Ile  
100 105 110

Glu Gln Thr Lys Gln Gly Thr Trp Leu Asn Pro Gly Phe Pro Pro Gln  
115 120 125

Ser Cys Gly Tyr Ala Thr Val Thr Asp Ala Glu Ala Ala Ile Val Gln  
130 135 140

Val Thr Pro His His Val Leu Val Asp Glu Tyr Thr Gly Glu Trp Val  
145 150 155 160

Asp Ser Gln Phe Ile Asn Gly Lys Cys Ser Asn Asp Ile Cys Pro Thr  
165 170 175

Val His Asn Ser Thr Thr Trp His Ser Asp Tyr Lys Val Lys Gly Leu  
180 185 190

Cys Asp Ser Asn Leu Ile Ser Met Asp Ile Thr Phe Phe Ser Glu Asp  
195 200 205

Gly Glu Leu Ser Ser Leu Gly Lys Glu Gly Thr Gly Phe Arg Ser Asn  
210 215 220

Tyr Phe Ala Tyr Glu Thr Gly Asp Lys Ala Cys Lys Met Gln Tyr Cys  
225 230 235 240

Lys Arg Trp Gly Val Arg Leu Pro Ser Gly Val Trp Phe Glu Met Ala  
245 250 255

Asp Lys Asp Leu Phe Ala Ala Ala Arg Phe Pro Glu Cys Pro Glu Gly  
260 265 270

Ser Ser Ile Ser Ala Pro Ser Gln Thr Ser Val Asp Val Ser Leu Ile  
275 280 285

Gln Asp Val Glu Arg Ile Leu  
290 295

<210> 43

<211> 234

<212> PRT

<213> Vesicular stomatitis virus

<400> 43

Pro Ser Gln Thr Ser Val Asp Val Ser Leu Ile Gln Asp Val Glu Arg  
1 5 10 15

Ile Leu Asp Tyr Ser Leu Cys Gln Glu Thr Trp Ser Lys Ile Arg Ala  
20 25 30

Gly Leu Pro Ile Ser Pro Val Asp Leu Ser Tyr Leu Ala Pro Lys Asn  
35 40 45

Pro Gly Thr Gly Pro Val Phe Thr Ile Ile Asn Gly Thr Leu Lys Tyr  
50 55 60

Phe Glu Thr Arg Tyr Ile Arg Val Asp Ile Ala Ala Pro Ile Leu Ser  
65 70 75 80

Arg Met Val Gly Met Ile Ser Gly Thr Thr Thr Glu Arg Glu Leu Trp  
85 90 95

Asp Asp Trp Ala Pro Tyr Glu Asp Val Glu Ile Gly Pro Asn Gly Val  
100 105 110

Leu Arg Thr Ser Ser Gly Tyr Lys Phe Pro Leu Tyr Met Ile Gly His  
115 120 125

Gly Met Leu Asp Ser Asp Leu His Leu Ser Ser Lys Ala Gln Val Phe  
130 135 140

Glu His Pro His Ile Gln Asp Ala Ala Ser Gln Leu Pro Asp Asp Glu  
145 150 155 160

Thr Leu Phe Phe Gly Asp Thr Gly Leu Ser Lys Asn Pro Ile Glu Phe  
165 170 175

Val Glu Gly Trp Phe Ser Ser Trp Lys Ser Ser Ile Ala Ser Phe Phe  
180 185 190

Phe Ile Ile Gly Leu Ile Ile Gly Leu Phe Leu Val Leu Arg Val Gly  
195 200 205

Ile Tyr Leu Cys Ile Lys Leu Lys His Thr Lys Lys Arg Gln Ile Tyr  
210 215 220

Thr Asp Ile Glu Met Asn Arg Leu Gly Lys  
225 230

<210> 44

<211> 511

<212> PRT

<213> Vesicular stomatitis virus

<220>

<221> MOD\_RES

<222> (1)..(511)

<223> "Xaa" represents any, other or unknown amino acid

<400> 44

Met Lys Cys Leu Leu Tyr Leu Ala Phe Leu Phe Ile Gly Val Asn Cys  
1 5 10 15

Lys Phe Thr Ile Val Phe Pro Tyr Asn Arg Lys Gly Asn Trp Lys Asn  
20 25 30

Val Pro Ser Asn Tyr His Tyr Cys Pro Ser Ser Ser Asp Leu Asn Trp  
35 40 45

His Asn Asp Leu Ile Gly Thr Ala Leu Gln Val Lys Met Pro Lys Ser  
50 55 60

His Lys Ala Ile Gln Ala Asp Gly Trp Met Cys His Ala Ser Lys Trp  
65 70 75 80

Val Thr Thr Cys Asp Phe Arg Trp Tyr Gly Pro Lys Tyr Ile Thr His  
85 90 95

Ser Ile Arg Ser Phe Thr Pro Ser Val Glu Gln Cys Lys Glu Ser Ile  
100 105 110

Glu Gln Thr Lys Gln Gly Thr Trp Leu Asn Pro Gly Phe Pro Pro Gln  
115 120 125

Ser Cys Gly Tyr Ala Thr Val Thr Asp Ala Glu Ala Ala Ile Val Gln  
130 135 140

Val Thr Pro His His Val Leu Val Asp Glu Tyr Thr Gly Glu Trp Val  
145 150 155 160

Asp Ser Gln Phe Ile Asn Gly Lys Cys Ser Asn Asp Ile Cys Pro Thr  
165 170 175

Val His Asn Ser Thr Thr Trp His Ser Asp Tyr Lys Val Lys Gly Leu  
180 185 190

Cys Asp Ser Asn Leu Ile Ser Met Asp Ile Thr Phe Phe Ser Glu Asp  
 195 200 205  
 Gly Glu Leu Ser Ser Leu Gly Lys Glu Gly Thr Gly Phe Arg Ser Asn  
 210 215 220  
 Tyr Phe Ala Tyr Glu Thr Gly Asp Lys Ala Cys Lys Met Gln Tyr Cys  
 225 230 235 240  
 Lys His Trp Gly Val Arg Leu Pro Ser Gly Val Trp Phe Glu Met Ala  
 245 250 255  
 Asp Lys Asp Leu Phe Ala Ala Ala Arg Phe Pro Glu Cys Pro Glu Gly  
 260 265 270  
 Ser Ser Ile Ser Ala Pro Ser Gln Thr Ser Val Asp Val Ser Leu Ile  
 275 280 285  
 Gln Asp Val Glu Arg Ile Leu Asp Tyr Ser Leu Cys Gln Glu Thr Trp  
 290 295 300  
 Ser Lys Ile Arg Ala Gly Leu Pro Ile Ser Pro Val Asp Leu Ser Tyr  
 305 310 315 320  
 Leu Ala Pro Lys Asn Pro Gly Thr Gly Pro Ala Phe Thr Ile Ile Asn  
 325 330 335  
 Gly Thr Leu Lys Tyr Phe Glu Thr Arg Tyr Ile Arg Val Asp Ile Ala  
 340 345 350  
 Ala Pro Ile Leu Ser Arg Met Val Gly Met Ile Ser Gly Thr Thr Thr  
 355 360 365  
 Glu Arg Glu Leu Trp Asp Asp Trp Ala Pro Tyr Glu Asp Val Glu Ile  
 370 375 380  
 Gly Pro Asn Gly Val Leu Arg Thr Ser Ser Gly Tyr Lys Phe Pro Leu  
 385 390 395 400  
 Tyr Met Ile Gly His Gly Met Leu Asp Ser Asp Leu His Leu Ser Ser  
 405 410 415  
 Lys Ala Gln Val Phe Glu His Pro His Ile Gln Asp Ala Xaa Ala Gln  
 420 425 430  
 Leu Pro Asp Asp Glu Thr Leu Phe Phe Gly Asp Thr Gly Leu Ser Lys  
 435 440 445  
 Asn Pro Ile Glu Phe Val Glu Gly Trp Phe Ser Ser Trp Lys Ser Ser  
 450 455 460  
 Ile Ala Ser Phe Phe Phe Ile Ile Gly Leu Ile Ile Gly Leu Phe Leu  
 465 470 475 480  
 Val Leu Arg Val Gly Ile Tyr Leu Cys Ile Lys Leu Lys His Thr Lys  
 485 490 495

Lys Arg Gln Ile Tyr Thr Asp Ile Glu Met Asn Arg Leu Gly Lys  
 500 505 510

<210> 45  
 <211> 465  
 <212> PRT  
 <213> Vesicular stomatitis virus

<400> 45  
 Met Lys Cys Leu Leu Tyr Leu Ala Phe Leu Phe Ile Gly Val Asn Cys  
 1 5 10 15

Lys Phe Thr Ile Val Phe Pro Tyr Asn Gln Lys Gly Asn Trp Lys Asn  
 20 25 30

Val Pro Ser Asn Tyr His Tyr Cys Pro Ser Ser Ser Asp Leu Asn Trp  
 35 40 45

His Asn Asp Leu Ile Gly Thr Ala Leu Gln Val Lys Met Pro Lys Ser  
 50 55 60

His Lys Ala Ile Gln Ala Asp Gly Trp Met Cys His Ala Ser Lys Trp  
 65 70 75 80

Val Thr Thr Cys Asp Phe Arg Trp Tyr Gly Pro Lys Tyr Ile Thr His  
 85 90 95

Ser Ile Arg Ser Phe Thr Pro Ser Val Glu Gln Cys Lys Glu Ser Ile  
 100 105 110

Glu Gln Thr Lys Gln Gly Thr Trp Leu Asn Pro Gly Phe Pro Pro Gln  
 115 120 125

Ser Cys Gly Tyr Ala Thr Val Thr Asp Ala Glu Ala Ala Ile Val Gln  
 130 135 140

Val Thr Pro His His Val Leu Val Asp Glu Tyr Thr Gly Glu Trp Val  
 145 150 155 160

Asp Ser Gln Phe Ile Asn Gly Lys Cys Ser Asn Asp Ile Cys Pro Thr  
 165 170 175

Val His Asn Ser Thr Thr Trp His Ser Asp Tyr Lys Val Lys Gly Leu  
 180 185 190

Cys Asp Ser Asn Leu Ile Ser Met Asp Ile Thr Phe Phe Ser Glu Asp  
 195 200 205

Gly Glu Leu Ser Ser Leu Gly Lys Glu Gly Thr Gly Phe Arg Ser Asn  
 210 215 220

Tyr Phe Ala Tyr Glu Thr Gly Asp Lys Ala Cys Lys Met Gln Tyr Cys  
 225 230 235 240

Lys Arg Trp Gly Val Arg Leu Pro Ser Gly Val Trp Phe Gly Met Ala



245                      250                      255  
 Asp Lys Asp Leu Phe Ala Ala Ala Arg Phe Pro Glu Cys Pro Glu Gly  
                          260                                      265                                      270  
 Ser Ser Ile Ser Ala Pro Ser Gln Thr Ser Val Asp Val Ser Leu Ile  
                          275                                      280                                      285  
 Gln Asp Val Glu Arg Ile Tyr Phe Glu Thr Arg Tyr Ile Arg Val Asp  
                          290                                      295                                      300  
 Ile Ala Ala Pro Ile Leu Ser Arg Met Val Gly Met Ile Ser Gly Thr  
                          305                                      310                                      315                                      320  
 Thr Thr Glu Arg Glu Leu Trp Asp Asp Trp Ala Pro Tyr Glu Asp Val  
    325                                      330                                      335  
 Glu Ile Gly Pro Asn Gly Val Leu Arg Thr Ser Ser Gly Tyr Lys Phe  
    340                                      345                                      350  
 Pro Leu Tyr Met Ile Gly His Gly Met Leu Asp Ser Asp Leu His Leu  
    355                                      360                                      365  
 Ser Ser Lys Ala Gln Val Phe Glu His Pro His Ile Gln Asp Ala Ala  
    370                                      375                                      380  
 Ser Gln Leu Pro Asp Asp Glu Thr Leu Phe Phe Gly Asp Thr Gly Leu  
    385                                      390                                      395                                      400  
 Ser Lys Asn Pro Ile Glu Phe Val Glu Gly Trp Phe Ser Ser Trp Lys  
    405                                      410                                      415  
 Ser Ser Ile Ala Ser Phe Phe Phe Ile Ile Gly Leu Ile Ile Gly Leu  
    420                                      425                                      430  
 Phe Leu Val Leu Arg Val Gly Ile Tyr Leu Cys Ile Lys Leu Lys His  
    435                                      440                                      445  
 Thr Lys Lys Arg Gln Ile Tyr Thr Asp Ile Glu Met Asn Arg Leu Gly  
    450                                      455                                      460  
 Lys  
 465

<210> 46  
 <211> 6330  
 <212> DNA  
 <213> Vesicular stomatitis virus

<400> 46  
 atggaagtcc acgattttga gaccgacgag ttcaatgatt tcaatgaaga tgactatgcc 60  
 acaagagaat tcctgaatcc cgatgagcgc atgacgtact tgaatcatgc tgattacaat 120  
 ttgaattctc ctctaattag tgatgatatt gacaatttga tcaggaaatt caattctctt 180  
 ccgattccct cgatgtggga tagtaagaac tgggatggag ttcttgagat gttaacatca 240  
 tgtcaagcca atcccatctc aacatctcag atgcataaat ggatgggaag ttggttaatg 300  
 tctgataatc atgatgccag tcaagggtat agttttttac atgaagtgga caaagaggca 360

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<211> 5327

<212> DNA

<213> Vesicular stomatitis virus

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<210> 50

<211> 2109

<212> PRT

<213> Vesicular stomatitis virus

<400> 50

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Asp Asp Tyr Ala Thr Arg Glu Phe Leu Asn Pro Asp Glu Arg Met Thr

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Tyr	Leu	Asn	His	Ala	Asp	Tyr	Asn	Leu	Asn	Ser	Pro	Leu	Ile	Ser	Asp
	35						40					45			
Asp	Ile	Asp	Asn	Leu	Ile	Arg	Lys	Phe	Asn	Ser	Leu	Pro	Ile	Pro	Ser
	50					55					60				
Met	Trp	Asp	Ser	Lys	Asn	Trp	Asp	Gly	Val	Leu	Glu	Met	Leu	Thr	Ser
	65				70					75					80
Cys	Gln	Ala	Asn	Pro	Ile	Ser	Thr	Ser	Gln	Met	His	Lys	Trp	Met	Gly
			85						90					95	
Ser	Trp	Leu	Met	Ser	Asp	Asn	His	Asp	Ala	Ser	Gln	Gly	Tyr	Ser	Phe
		100						105					110		
Leu	His	Glu	Val	Asp	Lys	Glu	Ala	Glu	Ile	Thr	Phe	Asp	Val	Val	Glu
	115						120					125			
Thr	Phe	Ile	Arg	Gly	Trp	Gly	Asn	Lys	Pro	Ile	Glu	Tyr	Ile	Lys	Lys
	130					135					140				
Glu	Arg	Trp	Thr	Asp	Ser	Phe	Lys	Ile	Leu	Ala	Tyr	Leu	Cys	Gln	Lys
	145				150					155					160
Phe	Leu	Asp	Leu	His	Lys	Leu	Thr	Leu	Ile	Leu	Asn	Ala	Val	Ser	Glu
			165						170					175	
Val	Glu	Leu	Leu	Asn	Leu	Ala	Arg	Thr	Phe	Lys	Gly	Lys	Val	Arg	Arg
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Ser	Ser	His	Gly	Thr	Asn	Ile	Cys	Arg	Ile	Arg	Val	Pro	Ser	Leu	Gly
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Pro	Thr	Phe	Ile	Ser	Glu	Gly	Trp	Ala	Tyr	Phe	Lys	Lys	Leu	Asp	Ile
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Leu	Met	Asp	Arg	Asn	Phe	Leu	Leu	Met	Val	Lys	Asp	Val	Ile	Ile	Gly
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Arg	Met	Gln	Thr	Val	Leu	Ser	Met	Val	Cys	Arg	Ile	Asp	Asn	Leu	Phe
			245						250					255	
Ser	Glu	Gln	Asp	Ile	Phe	Ser	Leu	Leu	Asn	Ile	Tyr	Arg	Ile	Gly	Asp
		260						265					270		
Lys	Ile	Val	Glu	Arg	Gln	Gly	Asn	Phe	Ser	Tyr	Asp	Leu	Ile	Lys	Met
	275						280					285			
Val	Glu	Pro	Ile	Cys	Asn	Leu	Lys	Leu	Met	Lys	Leu	Ala	Arg	Glu	Ser
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Arg	Pro	Leu	Val	Pro	Gln	Phe	Pro	His	Phe	Glu	Asn	His	Ile	Lys	Thr
	305				310					315					320
Ser	Val	Asp	Glu	Gly	Ala	Lys	Ile	Asp	Arg	Gly	Ile	Arg	Phe	Leu	His





	325		330		335
.	Asp Gln Ile Met Ser Val Lys Thr Val Asp Leu Thr Leu Val Ile Tyr	340	345		350
.	Gly Ser Phe Arg His Trp Gly His Pro Phe Ile Asp Tyr Tyr Thr Gly	355	360		365
	Leu Glu Lys Leu His Ser Gln Val Thr Met Lys Lys Asp Ile Asp Val	370	375		380
	Ser Tyr Ala Lys Ala Leu Ala Ser Asp Leu Ala Arg Ile Val Leu Phe	385	390		395
	Gln Gln Phe Asn Asp His Lys Lys Trp Phe Val Asn Gly Asp Leu Leu	405	410		415
	Pro His Asp His Pro Phe Lys Ser His Val Lys Glu Asn Thr Trp Pro	420	425		430
	Thr Ala Ala Gln Val Gln Asp Phe Gly Asp Lys Trp His Glu Leu Pro	435	440		445
	Leu Ile Lys Cys Phe Glu Ile Pro Asp Leu Leu Asp Pro Ser Ile Ile	450	455		460
	Tyr Ser Asp Lys Ser His Ser Met Asn Arg Ser Glu Val Leu Lys His	465	470		475
	Val Arg Met Asn Pro Asn Thr Pro Ile Pro Ser Lys Lys Val Leu Gln	485	490		495
	Thr Met Leu Asp Thr Lys Ala Thr Asn Trp Lys Glu Phe Leu Lys Glu	500	505		510
	Ile Asp Glu Lys Gly Leu Asp Asp Asp Asp Leu Ile Ile Gly Leu Lys	515	520		525
	Gly Lys Glu Arg Glu Leu Lys Leu Ala Gly Arg Phe Phe Ser Leu Met	530	535		540
	Ser Trp Lys Leu Arg Glu Tyr Phe Val Ile Thr Glu Tyr Leu Ile Lys	545	550		555
	Thr His Phe Val Pro Met Phe Lys Gly Leu Thr Met Ala Asp Asp Leu	565	570		575
	Thr Ala Val Ile Lys Lys Met Leu Asp Ser Ser Ser Gly Gln Gly Leu	580	585		590
	Lys Ser Tyr Glu Ala Ile Cys Ile Ala Asn His Ile Asp Tyr Glu Lys	595	600		605
	Trp Asn Asn His Gln Arg Lys Leu Ser Asn Gly Pro Val Phe Arg Val	610	615		620
	Met Gly Gln Phe Leu Gly Tyr Pro Ser Leu Ile Glu Arg Thr His Glu				

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Phe Phe Glu Lys Ser Leu Ile Tyr Tyr Asn Gly Arg Pro Asp Leu Met						
		645		650		655
Arg Val His Asn Asn Thr Leu Ile Asn Ser Thr Ser Gln Arg Val Cys						
		660		665		670
Trp Gln Gly Gln Glu Gly Gly Leu Glu Gly Leu Arg Gln Lys Gly Trp						
		675		680		685
Thr Ile Leu Asn Leu Leu Val Ile Gln Arg Glu Ala Lys Ile Arg Asn						
		690		695		700
Thr Ala Val Lys Val Leu Ala Gln Gly Asp Asn Gln Val Ile Cys Thr						
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Gln Tyr Lys Thr Lys Lys Ser Arg Asn Val Val Glu Leu Gln Gly Ala						
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Leu Asn Gln Met Val Ser Asn Asn Glu Lys Ile Met Thr Ala Ile Lys						
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Ile Gly Thr Gly Lys Leu Gly Leu Leu Ile Asn Asp Asp Glu Thr Met						
		755		760		765
Gln Ser Ala Asp Tyr Leu Asn Tyr Gly Lys Ile Pro Ile Phe Arg Gly						
		770		775		780
Val Ile Arg Gly Leu Glu Thr Lys Arg Trp Ser Arg Val Thr Cys Val						
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Thr Asn Asp Gln Ile Pro Thr Cys Ala Asn Ile Met Ser Ser Val Ser						
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Thr Asn Ala Leu Thr Val Ala His Phe Ala Glu Asn Pro Ile Asn Ala						
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Met Ile Gln Tyr Asn Tyr Phe Gly Thr Phe Ala Arg Leu Leu Leu Met						
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Ile Pro Gly Leu His Ser Ser Thr Phe Lys Tyr Ala Met Leu Tyr Leu						
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		885		890		895
Ile Arg Ala Phe Pro Asp Pro Val Thr Glu Ser Leu Ser Phe Trp Arg						
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Phe Ile His Val His Ala Arg Ser Glu His Leu Lys Glu Met Ser Ala						
		915		920		925
Val Phe Gly Asn Pro Glu Ile Ala Lys Phe Arg Ile Thr His Ile Asp						

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 Tyr His Glu Glu Asp Arg Leu Arg Ser Phe Leu Trp Ser Ile Asn Pro  
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 Leu Arg Tyr Lys Ser Trp Gly Arg Thr Val Ile Gly Thr Thr Val Pro  
 1090                      1095                      1100  
 His Pro Leu Glu Met Leu Gly Pro Gln His Arg Lys Glu Thr Pro Cys  
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 Ala Pro Cys Asn Thr Ser Gly Phe Asn Tyr Val Ser Val His Cys Pro  
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 Asp Gly Ile His Asp Val Phe Ser Ser Arg Gly Pro Leu Pro Ala Tyr  
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 Leu Gly Ser Lys Thr Ser Glu Ser Thr Ser Ile Leu Gln Pro Trp Glu  
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 Ala Ile Ser Trp Phe Val Glu Pro Asp Ser Lys Leu Ala Met Thr Ile  
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 His Gly Phe Lys Arg Thr Gly Ser Ala Leu His Arg Phe Ser Thr Ser  
 1220                      1225                      1230  
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Phe Asp Phe Leu Phe Gln Ala Thr Leu Leu Tyr Ala Gln Ile Thr Thr 1265	1270	1275 1280
Thr Val Ala Arg Asp Gly Trp Ile Thr Ser Cys Thr Asp His Tyr His 1285	1290	1295
Ile Ala Cys Lys Ser Cys Leu Arg Pro Ile Glu Glu Ile Thr Leu Asp 1300	1305	1310
Ser Ser Met Asp Tyr Thr Pro Pro Asp Val Ser His Val Leu Lys Thr 1315	1320	1325
Trp Arg Asn Gly Glu Gly Ser Trp Gly Gln Glu Ile Lys Gln Ile Tyr 1330	1335	1340
Pro Leu Glu Gly Asn Trp Lys Asn Leu Ala Pro Ala Glu Gln Ser Tyr 1345	1350	1355 1360
Gln Val Gly Arg Cys Ile Gly Phe Leu Tyr Gly Asp Leu Ala Tyr Arg 1365	1370	1375
Lys Ser Thr His Ala Glu Asp Ser Ser Leu Phe Pro Leu Ser Ile Gln 1380	1385	1390
Gly Arg Ile Arg Gly Arg Gly Phe Leu Lys Gly Leu Leu Asp Gly Leu 1395	1400	1405
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Pro Ile Arg Asp Glu Leu Glu Thr Ile Pro His Lys Ile Pro Thr Ser 1460	1465	1470
Tyr Pro Thr Ser Asn Arg Asp Met Gly Val Ile Val Arg Asn Tyr Phe 1475	1480	1485
Lys Tyr Gln Cys Arg Leu Ile Glu Lys Gly Lys Tyr Arg Ser His Tyr 1490	1495	1500
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Pro Phe Ser Ile Ser Thr Thr Leu Leu Gln Ile Leu Tyr Lys Pro Phe 1525	1530	1535
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Val Thr Ile Leu Gly Pro Met Phe Lys Thr Val Asp Leu Val Gln Thr 1810	1815	1820
Glu Phe Ser Ser Ser Gln Thr Ser Glu Val Tyr Met Val Cys Lys Gly 1825	1830	1835
Leu Lys Lys Leu Ile Asp Glu Pro Asn Pro Asp Trp Ser Ser Ile Asn		

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                          1860                      1865                      1870  
 Ala Arg Ala Lys Lys Val Ser Thr Tyr Phe Thr Leu Thr Gly Ile Pro  
                          1875                      1880                      1885  
 Ser Gln Phe Ile Pro Asp Pro Phe Val Asn Ile Glu Thr Met Leu Gln  
                          1890                      1895                      1900  
 Ile Phe Gly Val Pro Thr Gly Val Ser His Ala Ala Ala Leu Lys Ser  
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                          1940                      1945                      1950  
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                          1955                      1960                      1965  
 Thr Gly Ile Ser Phe Trp Leu Ser Leu Met Glu Lys Asp Ile Pro Leu  
                          1970                      1975                      1980  
 Tyr Gln Gln Cys Leu Ala Val Ile Gln Gln Ser Phe Pro Ile Arg Trp  
                          1985                      1990                      1995                      2000  
 Glu Ala Val Ser Val Lys Gly Gly Tyr Lys Gln Lys Trp Ser Thr Arg  
                          2005                      2010                      2015  
 Gly Asp Gly Leu Pro Lys Asp Thr Arg Thr Ser Asp Ser Leu Ala Pro  
                          2020                      2025                      2030  
 Ile Gly Asn Trp Ile Arg Ser Leu Glu Leu Val Arg Asn Gln Val Arg  
                          2035                      2040                      2045  
 Leu Asn Pro Phe Asn Glu Ile Leu Phe Asn Gln Leu Cys Arg Thr Val  
                          2050                      2055                      2060  
 Asp Asn His Leu Lys Trp Ser Asn Leu Arg Arg Asn Thr Gly Met Ile  
                          2065                      2070                      2075                      2080  
 Glu Trp Ile Asn Arg Arg Ile Ser Lys Glu Asp Arg Ser Ile Leu Met  
                          2085                      2090                      2095  
 Leu Lys Ser Asp Leu His Glu Glu Asn Ser Trp Arg Asp  
                          2100                      2105

<210> 51  
 <211> 1753  
 <212> PRT  
 <213> Vesicular stomatitis virus  
 <220>

<221> MOD\_RES

<222> (1)..(1753)

<223> "Xaa" represents any, other or unknown amino acid

<400> 51

His Trp Gly His Pro Phe Ile Asp Tyr Tyr Ala Gly Leu Glu Lys Leu  
1 5 10 15

His Ser Gln Val Thr Xaa Lys Lys Asp Ile Asp Val Ser Tyr Ala Lys  
20 25 30

Ala Leu Ala Ser Asp Leu Ala Arg Ile Val Leu Phe Gln Gln Phe Asn  
35 40 45

Asp His Xaa Lys Trp Phe Val Asn Gly Asp Leu Leu Pro His Asp His  
50 55 60

Pro Phe Lys Ser His Val Lys Glu Asn Thr Trp Pro Thr Ala Ala Gln  
65 70 75 80

Val Gln Asp Phe Gly Asp Lys Trp His Glu Leu Pro Leu Ile Lys Cys  
85 90 95

Phe Glu Ile Pro Asp Leu Leu Asp Pro Ser Ile Ile Tyr Ser Asp Lys  
100 105 110

Ser His Ser Met Asn Arg Ser Glu Val Leu Lys His Val Arg Met Asn  
115 120 125

Pro Asn Thr Pro Ile Pro Ser Lys Lys Val Leu Gln Thr Met Leu Asp  
130 135 140

Thr Lys Ala Thr Asn Trp Lys Glu Phe Leu Lys Glu Ile Asp Glu Lys  
145 150 155 160

Gly Leu Asp Asp Asp Asp Leu Ile Ile Gly Leu Lys Gly Lys Glu Arg  
165 170 175

Glu Leu Lys Leu Ala Gly Arg Phe Phe Ser Leu Met Ser Trp Lys Leu  
180 185 190

Arg Glu Tyr Phe Val Ile Thr Glu Tyr Leu Ile Lys Thr His Phe Val  
195 200 205

Pro Met Phe Lys Gly Leu Thr Met Ala Asp Asp Leu Thr Ala Val Ile  
210 215 220

Lys Lys Met Leu Asp Ser Ser Ser Gly Gln Gly Leu Lys Ser Tyr Glu  
225 230 235 240

Ala Ile Cys Ile Ala Asn His Ile Asp Tyr Glu Lys Trp Asn Asn His  
245 250 255

Gln Arg Lys Leu Ser Asn Gly Pro Val Phe Arg Val Met Gly Gln Phe  
260 265 270

Leu Gly Tyr Pro Ser Leu Ile Glu Arg Thr His Glu Phe Phe Glu Lys

275					280					285					
Ser	Leu	Ile	Tyr	Tyr	Asn	Gly	Arg	Pro	Asp	Leu	Met	Arg	Val	His	Asn
290						295					300				
Asn	Thr	Leu	Ile	Asn	Ser	Thr	Ser	Gln	Arg	Val	Cys	Trp	Gln	Gly	Gln
305				310						315					320
Glu	Gly	Gly	Leu	Glu	Gly	Leu	Arg	Gln	Lys	Gly	Trp	Ser	Ile	Leu	Asn
			325						330					335	
Leu	Leu	Val	Ile	Gln	Arg	Glu	Ala	Lys	Ile	Arg	Asn	Thr	Ala	Val	Lys
		340						345					350		
Val	Leu	Ala	Gln	Gly	Asp	Asn	Gln	Val	Ile	Cys	Thr	Gln	Tyr	Lys	Thr
	355						360					365			
Lys	Lys	Ser	Arg	Asn	Val	Val	Glu	Leu	Gln	Gly	Ala	Leu	Asn	Gln	Met
	370					375					380				
Val	Ser	Asn	Asn	Glu	Lys	Ile	Met	Thr	Ala	Ile	Lys	Ile	Gly	Thr	Gly
385					390					395					400
Lys	Leu	Gly	Leu	Leu	Ile	Asn	Asp	Asp	Glu	Thr	Met	Gln	Ser	Ala	Asp
			405						410					415	
Tyr	Leu	Asn	Tyr	Gly	Lys	Ile	Pro	Ile	Phe	Arg	Gly	Val	Ile	Arg	Gly
		420						425					430		
Leu	Glu	Thr	Lys	Arg	Trp	Ser	Arg	Val	Thr	Cys	Val	Thr	Asn	Asp	Gln
	435						440					445			
Ile	Pro	Thr	Cys	Ala	Asn	Ile	Met	Ser	Ser	Val	Ser	Thr	Asn	Ala	Leu
	450					455					460				
Thr	Val	Ala	His	Phe	Ala	Glu	Asn	Pro	Ile	Asn	Ala	Met	Ile	Gln	Tyr
465					470					475					480
Asn	Tyr	Phe	Gly	Thr	Phe	Ala	Arg	Leu	Leu	Leu	Met	Met	His	Asp	Pro
			485						490					495	
Ala	Leu	Arg	Gln	Ser	Leu	Tyr	Glu	Val	Gln	Asp	Lys	Ile	Pro	Gly	Leu
		500						505					510		
His	Ser	Ser	Thr	Phe	Lys	Tyr	Ala	Met	Leu	Tyr	Leu	Asp	Pro	Ser	Ile
	515						520					525			
Gly	Gly	Val	Ser	Gly	Met	Ser	Leu	Ser	Arg	Phe	Leu	Ile	Arg	Ala	Phe
	530					535					540				
Pro	Asp	Pro	Val	Thr	Glu	Ser	Leu	Ser	Phe	Trp	Arg	Phe	Ile	His	Val
545					550					555					560
His	Ala	Arg	Ser	Glu	His	Leu	Lys	Glu	Met	Ser	Ala	Val	Phe	Gly	Asn
			565						570					575	
Pro	Glu	Ile	Ala	Lys	Phe	Arg	Ile	Thr	His	Ile	Asp	Lys	Leu	Val	Glu



580										585					590				
Asp	Pro	Thr	Ser	Leu	Asn	Ile	Ala	Met	Gly	Met	Ser	Pro	Ala	Asn	Leu				
595					600					605									
Leu	Lys	Thr	Glu	Val	Lys	Lys	Cys	Leu	Ile	Glu	Ser	Arg	Gln	Thr	Ile				
610					615					620									
Arg	Asn	Gln	Val	Ile	Lys	Asp	Ala	Thr	Ile	Tyr	Leu	Tyr	His	Glu	Glu				
625					630					635					640				
Asp	Arg	Leu	Arg	Ser	Phe	Leu	Trp	Ser	Ile	Asn	Pro	Leu	Phe	Pro	Arg				
645					650					655									
Phe	Leu	Ser	Glu	Phe	Lys	Ser	Gly	Thr	Phe	Leu	Gly	Val	Ala	Asp	Gly				
660					665					670									
Leu	Ile	Ser	Leu	Phe	Gln	Asn	Ser	Arg	Thr	Ile	Arg	Asn	Ser	Phe	Lys				
675					680					685									
Lys	Lys	Tyr	His	Arg	Glu	Leu	Asp	Asp	Leu	Ile	Val	Arg	Ser	Glu	Val				
690					695					700									
Ser	Ser	Leu	Thr	His	Leu	Gly	Lys	Leu	His	Leu	Arg	Arg	Gly	Ser	Cys				
705					710					715					720				
Lys	Met	Trp	Thr	Cys	Ser	Ala	Thr	His	Ala	Asp	Thr	Leu	Arg	Tyr	Lys				
725					730					735									
Ser	Trp	Gly	Arg	Thr	Val	Ile	Gly	Thr	Thr	Val	Pro	His	Pro	Leu	Glu				
740					745					750									
Met	Leu	Gly	Pro	Gln	His	Arg	Lys	Glu	Thr	Pro	Cys	Ala	Pro	Cys	Asn				
755					760					765									
Thr	Ser	Gly	Phe	Asn	Tyr	Val	Ser	Val	His	Cys	Pro	Asp	Gly	Ile	His				
770					775					780									
Asp	Val	Phe	Ser	Ser	Arg	Gly	Pro	Leu	Pro	Ala	Tyr	Leu	Gly	Ser	Lys				
785					790					795					800				
Thr	Ser	Glu	Ser	Thr	Ser	Ile	Leu	Gln	Pro	Trp	Glu	Arg	Glu	Ser	Lys				
805					810					815									
Val	Pro	Leu	Ile	Lys	Arg	Ala	Thr	Arg	Leu	Arg	Asp	Ala	Ile	Ser	Trp				
820					825					830									
Phe	Val	Glu	Pro	Asp	Ser	Lys	Leu	Ala	Met	Thr	Ile	Leu	Ser	Asn	Ile				
835					840					845									
His	Ser	Leu	Thr	Gly	Glu	Glu	Trp	Thr	Lys	Arg	Gln	His	Gly	Phe	Lys				
850					855					860									
Arg	Thr	Gly	Ser	Ala	Leu	His	Arg	Phe	Ser	Thr	Ser	Arg	Met	Ser	His				
865					870					875					880				
Gly	Gly	Phe	Ala	Ser	Gln	Ser	Thr	Ala	Ala	Leu	Thr	Arg	Leu	Met	Ala				



885	890	895
Thr Thr Asp Thr Met Arg Asp Leu Gly Asp Gln Asn Phe Asp Phe Leu 900 905 910		
Phe Gln Ala Thr Leu Leu Tyr Ala Gln Ile Thr Thr Thr Val Ala Arg 915 920 925		
Asp Gly Trp Ile Thr Ser Cys Thr Asp His Tyr His Ile Ala Cys Lys 930 935 940		
Ser Cys Leu Arg Pro Ile Glu Glu Ile Thr Leu Asp Ser Ser Met Asp 945 950 955 960		
Tyr Thr Pro Pro Asp Val Ser His Val Leu Lys Thr Trp Arg Asn Gly 965 970 975		
Glu Gly Ser Trp Gly Gln Glu Ile Lys Gln Ile Tyr Pro Leu Glu Gly 980 985 990		
Asn Trp Lys Asn Leu Ala Pro Ala Glu Gln Ser Tyr Gln Val Gly Arg 995 1000 1005		
Cys Ile Gly Phe Leu Tyr Gly Asp Leu Ala Tyr Arg Lys Ser Thr His 1010 1015 1020		
Ala Glu Asp Ser Ser Leu Phe Pro Leu Ser Ile Gln Gly Arg Ile Arg 1025 1030 1035 1040		
Gly Arg Gly Phe Leu Lys Gly Leu Leu Asp Gly Leu Met Arg Ala Ser 1045 1050 1055		
Cys Cys Gln Val Ile His Arg Arg Ser Leu Ala His Leu Lys Arg Pro 1060 1065 1070		
Ala Asn Ala Val Tyr Gly Gly Leu Ile Tyr Leu Ile Asp Lys Leu Ser 1075 1080 1085		
Val Ser Pro Pro Phe Leu Ser Leu Thr Arg Ser Gly Pro Ile Arg Asp 1090 1095 1100		
Glu Leu Glu Thr Ile Pro His Lys Ile Pro Thr Ser Tyr Pro Thr Ser 1105 1110 1115 1120		
Asn Arg Asp Met Gly Val Ile Val Arg Asn Tyr Phe Lys Tyr Gln Cys 1125 1130 1135		
Arg Leu Ile Glu Lys Gly Lys Tyr Arg Ser His Tyr Ser Gln Leu Trp 1140 1145 1150		
Leu Phe Ser Asp Val Leu Ser Ile Asp Phe Ile Gly Pro Phe Ser Ile 1155 1160 1165		
Ser Thr Thr Leu Leu Gln Ile Leu Tyr Lys Pro Phe Leu Ser Gly Lys 1170 1175 1180		
Asp Lys Asn Glu Leu Arg Glu Leu Ala Asn Leu Ser Ser Leu Leu Arg		

1185	1190	1195	1200
Ser Gly Glu Gly Trp Glu Asp Ile His Val Lys Phe Phe Thr Lys Asp	1205	1210	1215
Ile Leu Leu Cys Pro Glu Glu Ile Arg His Ala Cys Lys Phe Gly Ile	1220	1225	1230
Ala Lys Asp Asn Asn Lys Asp Met Ser Tyr Pro Pro Trp Gly Arg Glu	1235	1240	1245
Ser Arg Gly Thr Ile Thr Thr Ile Pro Val Tyr Tyr Thr Thr Thr Pro	1250	1255	1260
Tyr Pro Lys Met Leu Glu Met Pro Pro Arg Ile Gln Asn Pro Leu Leu	1265	1270	1275
Ser Gly Ile Arg Leu Gly Gln Leu Pro Thr Gly Ala His Tyr Lys Ile	1285	1290	1295
Arg Ser Ile Leu His Gly Met Gly Ile His Tyr Arg Asp Phe Leu Ser	1300	1305	1310
Cys Gly Asp Gly Ser Gly Gly Met Thr Ala Ala Leu Leu Arg Glu Asn	1315	1320	1325
Val His Ser Arg Gly Ile Phe Asn Ser Leu Leu Glu Leu Ser Gly Ser	1330	1335	1340
Val Met Arg Gly Ala Ser Pro Glu Pro Pro Ser Ala Leu Glu Thr Leu	1345	1350	1355
Gly Gly Asp Lys Ser Arg Cys Val Asn Gly Glu Thr Cys Trp Glu Tyr	1365	1370	1375
Pro Ser Asp Leu Cys Asp Pro Arg Thr Trp Asp Tyr Phe Leu Arg Leu	1380	1385	1390
Lys Ala Gly Leu Gly Leu Gln Ile Asp Leu Ile Val Met Asp Met Glu	1395	1400	1405
Val Arg Asp Ser Ser Thr Ser Leu Lys Ile Glu Thr Asn Val Arg Asn	1410	1415	1420
Tyr Val His Arg Ile Leu Asp Glu Gln Gly Val Leu Ile Tyr Lys Thr	1425	1430	1435
Tyr Gly Thr Tyr Ile Cys Glu Ser Glu Lys Asn Ala Val Thr Ile Leu	1445	1450	1455
Gly Pro Met Phe Lys Thr Val Asp Leu Val Gln Thr Glu Phe Ser Ser	1460	1465	1470
Ser Gln Thr Ser Glu Val Tyr Met Val Cys Lys Gly Leu Lys Lys Leu	1475	1480	1485
Ile Asp Glu Pro Asn Pro Asp Trp Ser Ser Ile Asn Glu Ser Trp Lys			

1490	1495	1500
Asn Leu Tyr Ala Phe Gln Ser Ser Glu Gln Glu Phe Ala Arg Ala Lys 1505	1510	1515 1520
Lys Val Ser Thr Tyr Phe Thr Leu Thr Gly Ile Pro Ser Gln Phe Ile 1525	1530	1535
Pro Asp Pro Phe Val Asn Ile Glu Thr Met Leu Gln Ile Phe Gly Val 1540	1545	1550
Pro Thr Gly Val Ser His Ala Ala Ala Leu Lys Ser Ser Asp Arg Pro 1555	1560	1565
Ala Asp Leu Leu Thr Ile Ser Leu Phe Tyr Met Ala Ile Ile Ser Tyr 1570	1575	1580
Tyr Asn Ile Asn His Ile Arg Val Gly Pro Ile Pro Pro Asn Pro Pro 1585	1590	1595 1600
Ser Asp Gly Ile Ala Gln Asn Val Gly Ile Ala Ile Thr Gly Ile Ser 1605	1610	1615
Phe Trp Leu Ser Leu Met Glu Lys Asp Ile Pro Leu Tyr Gln Gln Cys 1620	1625	1630
Leu Ala Val Ile Gln Gln Ser Phe Pro Ile Arg Trp Glu Ala Val Ser 1635	1640	1645
Val Lys Gly Gly Tyr Lys Gln Lys Trp Ser Thr Arg Gly Asp Gly Leu 1650	1655	1660
Pro Lys Asp Thr Arg Ile Ser Asp Ser Leu Ala Pro Ile Gly Asn Trp 1665	1670	1675 1680
Ile Arg Ser Leu Glu Leu Val Arg Asn Gln Val Arg Leu Asn Pro Phe 1685	1690	1695
Asn Glu Ile Leu Phe Asn Gln Leu Cys Arg Thr Val Asp Asn His Leu 1700	1705	1710
Lys Trp Ser Asn Leu Arg Lys Asn Thr Gly Met Ile Glu Trp Ile Asn 1715	1720	1725
Arg Arg Ile Ser Lys Glu Asp Arg Ser Ile Leu Met Leu Lys Ser Asp 1730	1735	1740
Leu His Glu Glu Asn Ser Trp Arg Asp 1745	1750	

<210> 52  
 <211> 2109  
 <212> PRT  
 <213> Vesicular stomatitis virus  
  
 <220>

<221> MOD\_RES

<222> (1)..(2109)

<223> "Xaa" represents any, other or unknown amino acid

<400> 52

Met Glu Val His Asp Phe Glu Thr Asp Glu Phe Asn Asp Phe Asn Glu  
1 5 10 15

Asp Asp Tyr Ala Thr Arg Glu Phe Leu Asn Pro Asp Glu Arg Met Thr  
20 25 30

Tyr Leu Asn His Ala Asp Tyr Asn Leu Asn Ser Pro Leu Ile Ser Asp  
35 40 45

Asp Ile Asp Asn Leu Ile Arg Lys Phe Asn Ser Leu Pro Ile Pro Ser  
50 55 60

Met Trp Asp Ser Lys Asn Trp Asp Gly Val Leu Glu Met Leu Thr Ser  
65 70 75 80

Cys Gln Ala Asn Pro Ile Ser Thr Ser Gln Met His Lys Trp Met Gly  
85 90 95

Ser Trp Leu Met Ser Asp Asn His Asp Ala Ser Gln Gly Tyr Ser Phe  
100 105 110

Leu His Glu Val Asp Lys Glu Ala Glu Ile Thr Phe Asp Val Val Glu  
115 120 125

Thr Phe Ile Arg Gly Trp Gly Asn Lys Pro Ile Glu Tyr Ile Lys Lys  
130 135 140

Glu Arg Trp Thr Asp Ser Phe Lys Ile Leu Ala Tyr Leu Cys Gln Lys  
145 150 155 160

Phe Leu Asp Leu His Lys Leu Thr Leu Ile Leu Asn Ala Val Ser Glu  
165 170 175

Val Glu Leu Leu Asn Leu Ala Arg Thr Phe Lys Gly Lys Val Arg Arg  
180 185 190

Ser Ser His Gly Thr Asn Ile Cys Arg Leu Arg Val Pro Ser Leu Gly  
195 200 205

Pro Thr Phe Ile Ser Glu Gly Trp Ala Tyr Phe Lys Lys Leu Asp Ile  
210 215 220

Leu Met Asp Arg Asn Phe Leu Leu Met Val Lys Asp Val Ile Ile Gly  
225 230 235 240

Arg Met Gln Thr Val Leu Ser Met Val Cys Arg Ile Asp Asn Leu Phe  
245 250 255

Ser Glu Gln Asp Ile Phe Ser Leu Leu Asn Ile Tyr Arg Ile Gly Asp  
260 265 270

Lys Ile Val Glu Arg Gln Gly Asn Phe Ser Tyr Asp Leu Ile Lys Met



275	280	285
Val Glu Pro Ile Cys Asn Leu Arg Leu Met Lys Leu Ala Arg Glu Ser 290 295 300		
Arg Pro Leu Val Pro Gln Phe Pro His Phe Glu Asn His Ile Lys Thr 305 310 315 320		
Ser Val Asp Glu Gly Ala Lys Ile Asp Arg Gly Ile Arg Phe Leu His 325 330 335		
Asp Gln Ile Met Ser Val Lys Thr Val Asp Leu Thr Leu Val Ile Tyr 340 345 350		
Gly Ser Phe Arg His Trp Gly His Pro Phe Ile Asp Tyr Tyr Ala Gly 355 360 365		
Leu Glu Lys Leu His Ser Gln Val Thr Met Lys Lys Asp Ile Asp Val 370 375 380		
Ser Tyr Ala Lys Ala Leu Ala Ser Asp Leu Ala Arg Ile Val Leu Phe 385 390 395 400		
Gln Gln Phe Asn Asp His Lys Lys Trp Phe Val Asn Gly Asp Leu Leu 405 410 415		
Pro His Asp His Pro Phe Lys Ser His Val Lys Glu Asn Thr Trp Pro 420 425 430		
Thr Ala Ala Gln Val Gln Asp Phe Gly Asp Lys Trp His Glu Leu Pro 435 440 445		
Leu Ile Lys Cys Phe Glu Ile Pro Asp Leu Leu Asp Pro Ser Ile Ile 450 455 460		
Tyr Ser Asp Lys Ser His Ser Met Asn Arg Ser Glu Val Leu Lys His 465 470 475 480		
Val Arg Met Asn Pro Asn Thr Pro Ile Pro Ser Lys Lys Val Leu Gln 485 490 495		
Thr Met Leu Asp Thr Lys Ala Thr Asn Trp Lys Glu Phe Leu Lys Glu 500 505 510		
Ile Asp Glu Lys Gly Leu Asp Asp Asp Leu Ile Ile Gly Leu Lys 515 520 525		
Gly Lys Glu Arg Glu Leu Lys Leu Ala Gly Arg Phe Phe Ser Leu Met 530 535 540		
Ser Trp Lys Leu Arg Glu Tyr Phe Val Ile Thr Glu Tyr Leu Ile Lys 545 550 555 560		
Thr His Phe Val Pro Met Phe Lys Gly Leu Thr Met Ala Asp Asp Leu 565 570 575		
Thr Ala Val Ile Lys Lys Met Leu Asp Ser Ser Ser Gly Gln Gly Leu		



	580		585		590
.	Lys Ser Tyr Glu Ala Ile Cys	Ile Ala Asn His Ile Asp Tyr Glu Lys			
	595	600	605		
'	Trp Asn Asn His Gln Arg Lys	Leu Ser Asn Gly Pro Val Phe Arg Val			
	610	615	620		
	Met Gly Gln Phe Leu Gly Tyr Pro Ser Leu	Ile Glu Arg Thr His Glu			
	625	630	635		640
	Phe Phe Glu Lys Ser Leu Ile Tyr Tyr	Asn Gly Arg Pro Asp Leu Met			
		645	650		655
	Arg Val His Asn Asn Thr Leu Ile	Asn Ser Thr Ser Gln Arg Val Cys			
		660	665		670
	Trp Gln Gly Gln Glu Gly Gly Leu Glu Gly	Leu Arg Gln Lys Gly Trp			
		675	680		685
	Ser Ile Leu Asn Leu Leu Val Ile Gln Arg	Glu Ala Lys Ile Arg Asn			
		690	695		700
	Thr Ala Val Lys Val Leu Ala Gln Gly Asp	Asn Gln Val Ile Cys Thr			
		705	710		715
	Gln Tyr Lys Thr Lys Lys Ser Arg Asn Val	Val Glu Leu Gln Gly Ala			
		725	730		735
	Leu Asn Gln Met Val Ser Asn Asn Glu Lys	Ile Met Thr Ala Ile Lys			
		740	745		750
	Ile Gly Thr Gly Lys Leu Gly Leu Leu Ile	Asn Asp Asp Glu Thr Met			
		755	760		765
	Gln Ser Ala Asp Tyr Leu Asn Tyr Gly Lys	Ile Pro Ile Phe Arg Gly			
		770	775		780
	Val Ile Arg Gly Leu Glu Thr Lys Arg Trp	Ser Arg Val Thr Cys Val			
		785	790		795
	Thr Asn Asp Gln Ile Pro Thr Cys Ala Asn	Ile Met Ser Ser Val Ser			
		805	810		815
	Thr Asn Ala Leu Thr Val Ala His Phe Ala	Glu Asn Pro Ile Asn Ala			
		820	825		830
	Met Ile Gln Tyr Asn Tyr Phe Gly Thr Phe	Ala Arg Leu Leu Leu Met			
		835	840		845
	Met His Asp Pro Ala Leu Arg Gln Ser Leu	Tyr Glu Val Gln Asp Lys			
		850	855		860
	Ile Pro Gly Leu His Ser Ser Thr Phe Lys	Tyr Ala Met Leu Tyr Leu			
		865	870		875
	Asp Pro Ser Ile Gly Gly Val Ser Gly Met	Ser Leu Ser Arg Phe Leu			

885										890					895				
Ile	Arg	Ala	Phe	Pro	Asp	Pro	Val	Thr	Glu	Ser	Leu	Ser	Phe	Trp	Arg				
			900						905					910					
Phe	Ile	His	Val	His	Ala	Arg	Ser	Glu	His	Leu	Lys	Glu	Met	Ser	Ala				
		915					920					925							
Val	Phe	Gly	Asn	Pro	Glu	Ile	Ala	Lys	Phe	Arg	Ile	Thr	His	Ile	Asp				
	930					935					940								
Lys	Leu	Val	Glu	Asp	Pro	Thr	Ser	Leu	Asn	Ile	Ala	Met	Gly	Met	Ser				
945					950					955						960			
Pro	Ala	Asn	Leu	Leu	Lys	Thr	Glu	Val	Lys	Lys	Cys	Leu	Ile	Glu	Ser				
				965					970					975					
Arg	Gln	Thr	Ile	Arg	Asn	Gln	Val	Ile	Lys	Asp	Ala	Thr	Ile	Tyr	Leu				
			980					985					990						
Tyr	His	Glu	Glu	Asp	Arg	Leu	Arg	Ser	Phe	Leu	Trp	Ser	Ile	Asn	Pro				
		995				1000						1005							
Leu	Phe	Pro	Arg	Phe	Leu	Ser	Glu	Phe	Lys	Ser	Gly	Thr	Phe	Leu	Gly				
	1010					1015					1020								
Val	Ala	Asp	Gly	Leu	Ile	Ser	Leu	Phe	Gln	Asn	Ser	Arg	Thr	Ile	Arg				
1025					1030					1035					1040				
Asn	Ser	Phe	Lys	Lys	Lys	Tyr	His	Arg	Glu	Leu	Asp	Asp	Leu	Ile	Val				
			1045						1050					1055					
Arg	Ser	Glu	Val	Ser	Ser	Leu	Thr	His	Leu	Gly	Lys	Leu	His	Leu	Arg				
		1060						1065					1070						
Arg	Gly	Ser	Cys	Lys	Met	Trp	Thr	Cys	Ser	Ala	Thr	His	Ala	Asp	Thr				
	1075					1080						1085							
Leu	Arg	Tyr	Lys	Ser	Trp	Gly	Arg	Thr	Val	Ile	Gly	Thr	Thr	Val	Pro				
	1090					1095					1100								
His	Pro	Leu	Glu	Met	Leu	Gly	Pro	Gln	His	Arg	Lys	Glu	Thr	Pro	Cys				
1105					1110					1115					1120				
Ala	Pro	Cys	Asn	Thr	Ser	Gly	Phe	Asn	Tyr	Val	Ser	Val	His	Cys	Pro				
			1125						1130					1135					
Asp	Gly	Ile	His	Asp	Val	Phe	Ser	Ser	Arg	Gly	Pro	Leu	Pro	Ala	Tyr				
		1140					1145						1150						
Leu	Gly	Ser	Lys	Thr	Ser	Glu	Ser	Thr	Ser	Ile	Leu	Gln	Pro	Trp	Glu				
	1155					1160					1165								
Arg	Glu	Ser	Lys	Val	Pro	Leu	Ile	Lys	Arg	Ala	Thr	Arg	Leu	Arg	Asp				
	1170					1175				1180									
Ala	Ile	Ser	Trp	Phe	Val	Glu	Pro	Asp	Ser	Lys	Leu	Ala	Met	Thr	Ile				



1185	1190	1195	1200
Leu Ser Asn Ile His Ser Leu Thr Gly Glu Glu Trp Thr Lys Arg Gln	1205	1210	1215
His Gly Phe Lys Arg Thr Gly Ser Ala Leu His Arg Phe Ser Thr Ser	1220	1225	1230
Arg Met Ser His Gly Gly Phe Ala Ser Gln Ser Thr Ala Ala Leu Thr	1235	1240	1245
Arg Leu Met Ala Thr Thr Asp Thr Met Arg Asp Leu Gly Asp Gln Asn	1250	1255	1260
Phe Asp Phe Leu Phe Xaa Ala Thr Leu Leu Tyr Ala Xaa Ile Thr Thr	1265	1270	1275
Thr Val Ala Arg Asp Gly Trp Ile Thr Ser Cys Thr Asp His Tyr His	1285	1290	1295
Ile Ala Cys Lys Ser Cys Leu Arg Pro Ile Glu Glu Ile Thr Leu Asp	1300	1305	1310
Ser Ser Met Asp Tyr Thr Pro Pro Asp Val Ser His Val Leu Lys Thr	1315	1320	1325
Trp Arg Asn Gly Glu Gly Ser Trp Gly Gln Glu Ile Lys Gln Ile Tyr	1330	1335	1340
Pro Leu Glu Gly Asn Trp Lys Asn Leu Ala Pro Ala Glu Gln Ser Tyr	1345	1350	1355
Gln Val Gly Arg Cys Ile Gly Phe Leu Tyr Gly Asp Leu Ala Tyr Arg	1365	1370	1375
Lys Ser Thr His Ala Glu Asp Ser Ser Leu Phe Pro Leu Ser Ile Gln	1380	1385	1390
Gly Arg Ile Arg Gly Arg Gly Phe Leu Lys Gly Leu Leu Asp Gly Leu	1395	1400	1405
Met Arg Ala Ser Cys Cys Gln Val Ile His Arg Arg Ser Leu Ala His	1410	1415	1420
Leu Lys Arg Pro Ala Asn Ala Val Tyr Gly Gly Leu Ile Tyr Leu Ile	1425	1430	1435
Asp Lys Leu Ser Val Ser Pro Pro Phe Leu Ser Leu Thr Arg Ser Gly	1445	1450	1455
Pro Ile Arg Asp Glu Leu Glu Thr Ile Pro His Lys Ile Pro Thr Ser	1460	1465	1470
Tyr Pro Thr Ser Asn Arg Asp Met Gly Val Ile Val Arg Asn Tyr Phe	1475	1480	1485
Lys Tyr Gln Cys Arg Leu Ile Glu Lys Gly Lys Tyr Arg Ser His Tyr			

1490	1495	1500
Ser Gln Leu Trp Leu Phe Ser Asp Val Leu Ser Ile Asp Phe Ile Gly 1505                      1510                      1515                      1520		
Pro Phe Ser Ile Ser Thr Thr Leu Leu Gln Ile Leu Tyr Lys Pro Phe 1525                      1530                      1535		
Leu Ser Gly Lys Asp Lys Asn Glu Leu Arg Glu Leu Ala Asn Leu Ser 1540                      1545                      1550		
Ser Leu Leu Arg Ser Gly Glu Gly Trp Glu Asp Ile His Val Lys Phe 1555                      1560                      1565		
Phe Thr Lys Asp Ile Leu Leu Cys Pro Glu Glu Ile Arg His Ala Cys 1570                      1575                      1580		
Lys Phe Gly Ile Ala Lys Asp Asn Asn Lys Asp Met Ser Tyr Pro Pro 1585                      1590                      1595                      1600		
Trp Gly Arg Glu Ser Arg Gly Thr Ile Thr Thr Ile Pro Val Tyr Tyr 1605                      1610                      1615		
Thr Thr Thr Pro Tyr Pro Lys Met Leu Glu Met Pro Pro Arg Ile Gln 1620                      1625                      1630		
Asn Pro Leu Leu Ser Gly Ile Arg Leu Gly Gln Leu Pro Thr Gly Ala 1635                      1640                      1645		
His Tyr Lys Ile Arg Ser Ile Leu His Gly Met Gly Ile His Tyr Arg 1650                      1655                      1660		
Asp Phe Leu Ser Cys Gly Asp Gly Ser Gly Gly Met Thr Ala Ala Leu 1665                      1670                      1675                      1680		
Leu Arg Glu Asn Val His Ser Arg Gly Ile Phe Asn Ser Leu Leu Glu 1685                      1690                      1695		
Leu Ser Gly Ser Val Met Arg Gly Ala Ser Pro Glu Pro Pro Ser Ala 1700                      1705                      1710		
Leu Glu Thr Leu Gly Gly Asp Lys Ser Arg Cys Val Asn Gly Glu Thr 1715                      1720                      1725		
Cys Trp Glu Tyr Pro Ser Asp Leu Cys Asp Pro Arg Thr Trp Asp Tyr 1730                      1735                      1740		
Phe Leu Arg Leu Lys Ala Gly Leu Gly Leu Gln Ile Asp Leu Ile Val 1745                      1750                      1755                      1760		
Met Asp Met Glu Val Arg Asp Ser Ser Thr Ser Leu Lys Ile Glu Thr 1765                      1770                      1775		
Asn Val Arg Asn Tyr Val His Arg Ile Leu Asp Glu Gln Gly Val Leu 1780                      1785                      1790		
Ile Tyr Lys Thr Tyr Gly Thr Tyr Ile Cys Glu Ser Glu Lys Asn Ala		

1795	1800	1805
Val Thr Ile Leu Gly Pro Met Phe Lys Thr Val Asp Leu Val Gln Thr 1810 1815 1820		
Glu Phe Ser Ser Ser Gln Thr Ser Glu Val Tyr Met Val Cys Lys Gly 1825 1830 1835 1840		
Leu Lys Lys Leu Ile Asp Glu Pro Asn Pro Asp Trp Ser Ser Ile Asn 1845 1850 1855		
Glu Ser Trp Lys Asn Leu Tyr Ala Phe Gln Ser Ser Glu Gln Glu Phe 1860 1865 1870		
Ala Arg Ala Lys Lys Val Ser Thr Tyr Phe Thr Leu Thr Gly Ile Pro 1875 1880 1885		
Ser Gln Phe Ile Pro Asp Pro Phe Val Asn Ile Glu Thr Met Leu Gln 1890 1895 1900		
Ile Phe Gly Val Pro Thr Gly Val Ser His Ala Ala Ala Leu Lys Ser 1905 1910 1915 1920		
Ser Asp Arg Pro Ala Asp Leu Leu Thr Ile Ser Leu Phe Tyr Met Ala 1925 1930 1935		
Ile Ile Ser Tyr Tyr Asn Ile Asn His Ile Arg Val Gly Pro Ile Pro 1940 1945 1950		
Pro Asn Pro Pro Ser Asp Gly Ile Ala Gln Asn Val Gly Ile Ala Ile 1955 1960 1965		
Thr Gly Ile Ser Phe Trp Leu Ser Leu Met Glu Lys Asp Ile Pro Leu 1970 1975 1980		
Tyr Gln Gln Cys Leu Ala Val Ile Gln Gln Ser Phe Pro Ile Arg Trp 1985 1990 1995 2000		
Glu Ala Val Ser Val Lys Gly Gly Tyr Lys Gln Lys Trp Ser Thr Arg 2005 2010 2015		
Gly Asp Gly Leu Pro Lys Asp Thr Arg Ile Ser Asp Ser Leu Ala Pro 2020 2025 2030		
Ile Gly Asn Trp Ile Arg Ser Leu Glu Leu Val Arg Asn Gln Val Arg 2035 2040 2045		
Leu Asn Pro Phe Asn Glu Ile Leu Phe Asn Gln Leu Cys Arg Thr Val 2050 2055 2060		
Asp Asn His Leu Lys Trp Ser Asn Leu Arg Lys Asn Thr Gly Met Ile 2065 2070 2075 2080		
Glu Trp Ile Asn Arg Arg Ile Ser Lys Glu Asp Arg Ser Ile Leu Met 2085 2090 2095		
Leu Lys Ser Asp Leu His Glu Glu Asn Ser Trp Arg Asp		



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